Central Coast Council

STATE OF THE ENVIRONMENT REPORT 2020

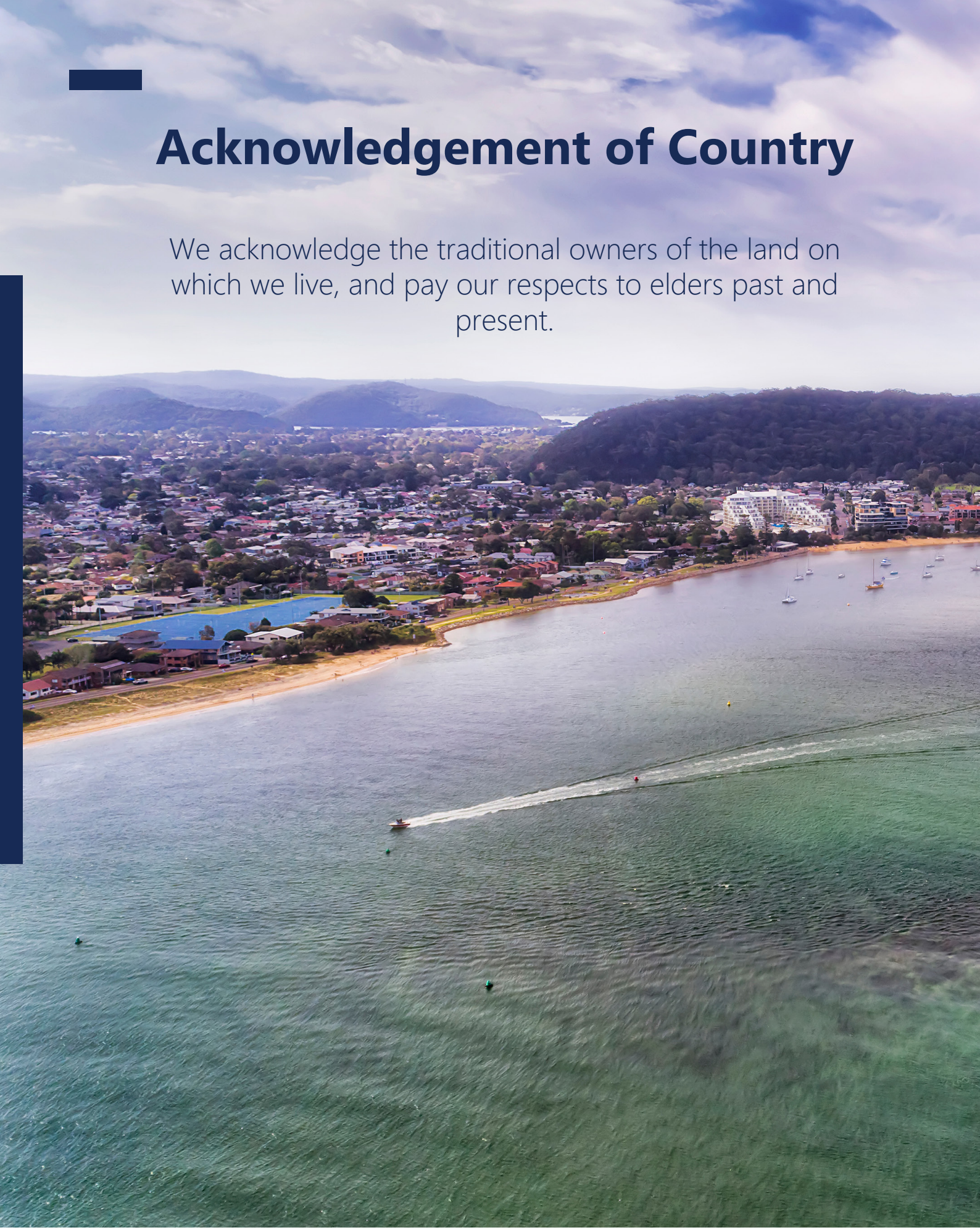
Our vision:

"A vibrant and sustainable Central Coast"

Contents

Acknowledgement of Country

We acknowledge the traditional owners of the land on which we live, and pay our respects to elders past and present.



Introduction

This is the first State of the Environment Report (SoE) for Central Coast Council and reports on the progress against the Community Strategic Plan Theme of Green.

The SoE is required under the Local Government Act Section 428A every four years during the year of an ordinary council election.

The SoE consists of seven chapters:

Air

Biodiversity

Climate and Energy

Land

Transport

Waste

Water

Each chapter stands alone but collectively they provide the overall status of the environment for the Central Coast.

A key component throughout each Chapter are the key drivers of economy and population. These can directly impact on the environment i.e. any fluctuations in economy, such as Gross Regional Product can influence productivity and employment in addition to housing, whilst population growth can impact on the environment by encroaching on local habitat and vulnerable fauna and flora.

It is important to note, that whilst Central Coast Council is the custodian of the SoE Report other agencies also have a role to play as well as the community in addressing environmental impacts.

About the Central Coast

The Central Coast Council area is located on the coast of New South Wales, between 60 and 90 kilometres north of the Sydney CBD, and about 80 kilometres south of the Newcastle CBD and has a projected population of 414,615 by 2036. The Central Coast Council area is bounded by Cessnock City, Lake Macquarie City and Lake Macquarie in the north, the Tasman Sea in the east, the Hawkesbury River and Hornsby Shire in the south, and Hawkesbury City in the west.

The Central Coast Council area is a rural and residential area, with some commercial and industrial land use. Rural land is used mainly for farming, timber-getting and coal mining for electricity generation. The Central Coast Council area encompasses a total land area of about 1,680 square kilometres, including more than 80 kilometres of coastline. More than half of the Council area is national parks, state forest, bushland, open space, nature reserves and aquatic environments (beaches and waterways). The population is dispersed across a variety of urban settings, including towns, villages and neighbourhoods. The largest centres are Gosford, Tuggerah-Wyong, Erina, Woy Woy and The Entrance.

Progress Indicators

The progress indicators within this report have been developed and adapted from accepted industry sources. The following grading criteria has been applied, which is aligned to the NSW Environment Protection Authority's State of the Environment Report 2018.

Status	Environmental Trend	Information Reliability
 **Good:** positive or healthy condition	 **Getting better:** condition is improving	**Good**
 **Moderate:** condition is neither good nor poor	 **Stable:** no significant change	**Reasonable**
 **Poor:** poor condition or under significant stress	 **Getting worse:** condition is deteriorating	**Limited**
 **Variable:** condition is mixed		
 **Unknown:** insufficient data is available to make assessment		

Community Strategic Plan:

Green Theme

The Central Coast is known for its natural beauty; maintaining our natural assets is a critical component of what we value as a community. Ongoing education is key to our green approach, as is inviting the community to take a hands-on role in conservation, protection and remediation of our environment. Reducing litter, minimising waste and championing renewable energy in our future design and planning will minimise the impacts of climate change in our region and will enable the preservation of our beaches, waterways, wildlife corridors and inland areas for the variety of species that inhabit them.

ENVIRONMENTAL RESOURCES FOR THE FUTURE

Objectives

E1 Educate the community on the value and importance of natural areas and biodiversity and encourage community involvement in caring for our natural environment

E2 Improve water quality for beaches, lakes and waterways including minimising pollutants and preventing litter entering our waterways

E3 Reduce littering, minimise waste to landfill and educate to strengthen positive environmental behaviours

E4 Incorporate renewable energy and energy efficiency in future design and planning and ensure responsible use of water and other resources

CHERISHED AND PROTECTED NATURAL BEAUTY

Objectives

F1 Protect our rich environmental heritage by conserving beaches, waterways, bushland, wildlife corridors and inland areas and the diversity of local native species

F2 Promote greening and ensure the wellbeing of communities through the protection of local bushland, urban trees, tree canopies and expansion of the Coastal Open Space System (COSS)

F3 Improve enforcement for all types of environmental non-compliance including littering and illegal dumping and encourage excellence in industry practices to protect and enhance environmental health

F4 Address climate change and its impacts through collaborative strategic planning and responsible land management and consider targets and action

Commitment to Climate Change

Central Coast Council is committed to act to reduce the impacts of climate change through independent and collaborative actions that are designed to lessen the impact of climate change.

Council will need support in its efforts to reduce greenhouse gas emissions in the region. As such Council will advocate, lobby or partner with the State and Federal Governments to ensure action on a local, state and national scale.

Council will also engage with the community to produce a place-based Climate Action Plan. This Plan will set out actions that Council and the broader Central Coast Community (including business and industry) can implement to continue to reduce greenhouse gas emissions. The Plan will also seek to understand any adaptation planning that may be needed to ensure our community is more resilient to the changing climate long into the future.

Council's ongoing commitment to action on climate change is evident through the adoption of its first Climate Change Policy in 2019. The policy sets out Councils commitment to mitigating the impact of climate change on the Central Coast region.

The policy contains 9 key strategic principles and statements that will influence the way that Council conducts its operations responding to climate change.

Future actions include the development of:

- **Climate Change Action Plan**
- **Sea Level Rise Policy**
- **Energy and Emissions Reduction policy**
- **Sustainability Strategy**
- **Disaster Resilience Strategy**
- **Greener Places Strategy**
- **Biodiversity Strategy**

Source: Central Coast Climate Change Policy 2019

Sustainability Statement

The values of the Central Coast community are strongly tied to our local natural environment, including beaches, waterways, ridges, estuaries, lakes and valley floors. The parks, gardens and natural bushland contribute to the lifestyle, culture and beauty of the region.

Large bushland and wetland areas are important for our air and water quality and provide homes for birds, animals and native plants. We value open space that is expansive and connected, that enables passive recreation activities such as walking, cycling and getting together with family and friends. Our natural areas can be quiet and peaceful places for contemplation and enjoyment that enhance our emotional wellbeing.

We are committed to leaving a positive legacy for future generations through responsible stewardship of our natural areas – this is our shared responsibility as residents of the Central Coast. We encourage our community to contribute to that stewardship by minimising resource use (energy, water, and waste) and treating these natural areas with respect.

Creating a vibrant, liveable and sustainable future for the Central Coast is a key priority. Implementing sustainable practices requires a holistic and place-based approach to land use planning. This includes reducing environmental impacts such as pollution and loss of biodiversity and ensuring that the built environment is sustainable and responsive to the health of our residents.

We support the United Nations 2030 agenda for sustainable development and seek to align our corporate and community values with the 17 UN Sustainable Development Goals.

We recognise the need to take action to address climate change and will continue to build sustainability measures into all future planning processes.

Source: Community Strategic Plan 2018-2028, *One - Central Coast*

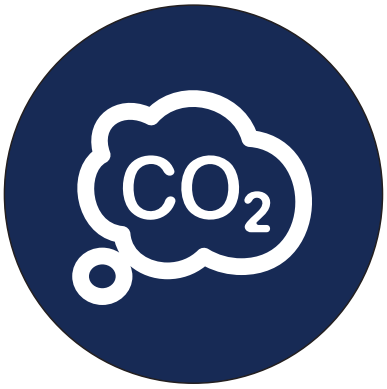
100%
of Central Coast air quality was 'very good' or 'good' in 2017

21%
of air pollution is due to transport

Air: Energy generation, industrial and manufacturing processes and transport give rise to emissions contributing to air quality.

Air

Introduction



NSW air quality is generally good and complies with national standards for carbon monoxide, nitrogen dioxide, lead and sulfur dioxide whilst levels for fine particle pollutions and ozone continue to be of concern, Australia has the most stringent $PM_{2.5}$ standards in the world.

Monitoring of air quality on the Central Coast is part of the Greater Sydney Metropolitan Region and Lower Hunter Region.

Since 1990, research has been undertaken on the adverse effects of air pollution. The World Health Organisation documents the long-term effects of air pollutions as chronic respiratory, cardio vascular disease and mortality.

Particulate matter, also known as particle pollution or PM, is a term that describes extremely small solid particles and liquid droplets suspended in air. Particulate matter can be made up of a variety of components including nitrates, sulphates, organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores). The two types of matter include:

- PM_{10} - these particles are small enough to pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects.
- $PM_{2.5}$ - these particles are so small they can get deep into the lungs and into the bloodstream. Exposure to $PM_{2.5}$ over long periods can cause adverse health effects.

Main source of pollutants in NSW are:

- Industry
- Motor vehicles
- Domestic wood smoke
- Hazard reduction burns and bushfires

Progress Indicators Summary

Indicator	Status	Environmental Trend	Information Reliability
% movement in Greenhouse Gas Emissions			**Reasonable**
We can enjoy fresh clean air on the Central Coast			**Reasonable**
Concentration of particles PM_{10}			**Good**
Concentration of particles $PM_{2.5}$			**Good**

Status

In 1998 the National Environment Protection Council determined national air quality standards which were set for six key air pollutants:

- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Photochemical oxidants
- Sulfur dioxide (SO_2)
- Particles (PM_{10} and $PM_{2.5}$)
- Lead

The standards are as follows:

Pollutant	Averaging period	Standard (maximum concentration)	Goal (maximum number of allowable exceedances)
Carbon monoxide	8-hour rolling average	9.0 ppm	1 day a year
Nitrogen dioxide	1-hour average	0.120 ppm	1 day a year
	1-year average	0.030 ppm	None
Phtochemical oxidants	1-hour average	0.100 ppm	1 day a year
	4-hour rolling average	0.080 ppm	1 day a year
Sulfur dioxide	1-hour average	0.200 ppm	1 day a year
	1-day average	0.080 ppm	1 day a year
	1-year average	0.020 ppm	None
Particles as PM_{10}	1-day average	50.0 µg/m^3	None
	1-year average	25.0 µg/m^3	None
Particles as $PM_{2.5}$	1-day average	25.0 µg/m^3	None
	1-year average	8.0 µg/m^3	None
Lead	1-year average	0.50 µg/m^3	None

Table 1: National Environment Protection (Ambient Air quality) Measure standards and goals (updated 2016)

Air quality in NSW is managed by the NSW Department of Planning, Industry and Environment through an extensive network of monitoring sites. For the Central Coast this is Wyong. Other monitoring for individual industry is undertaken and reported by the National Pollutant Inventory.

Throughout 2017 PM_{10} remained stable compared to other areas with slightly elevated readings for the Hunter and Upper Hunter.

The rise in PM_{10} for the Hunter and Upper Hunter can be attributed to drought (natural rivers becoming dust bowls), bushfires and climatic conditions. PM_{10} and $PM_{2.5}$ particles are more prevalent during the warmer months and during bushfire conditions.

$PM_{2.5}$ has been slightly increasing for the Central Coast between 2015 – 2017, with higher readings in 2015 then decreasing slightly in 2016 and a slight rise in 2017.

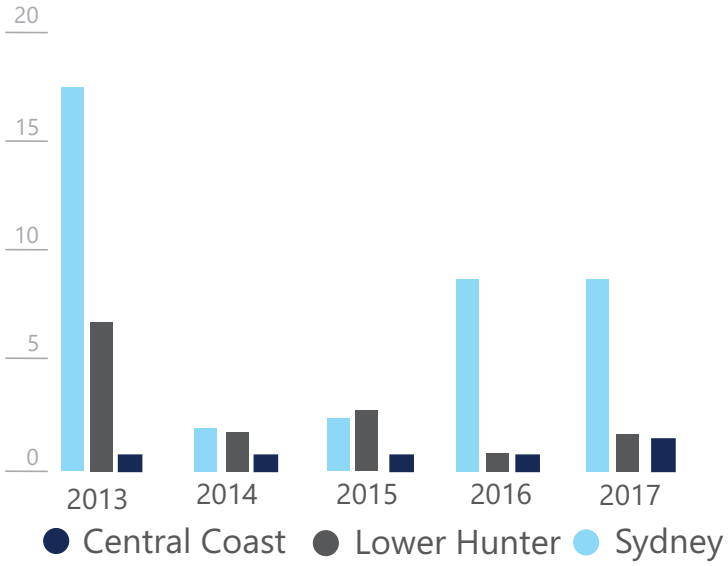


Figure 1: Number of days the Ambient Air Quality National Environment Protection Measure 24 hour standard for particles (PM_{10}) was exceeded in Sydney

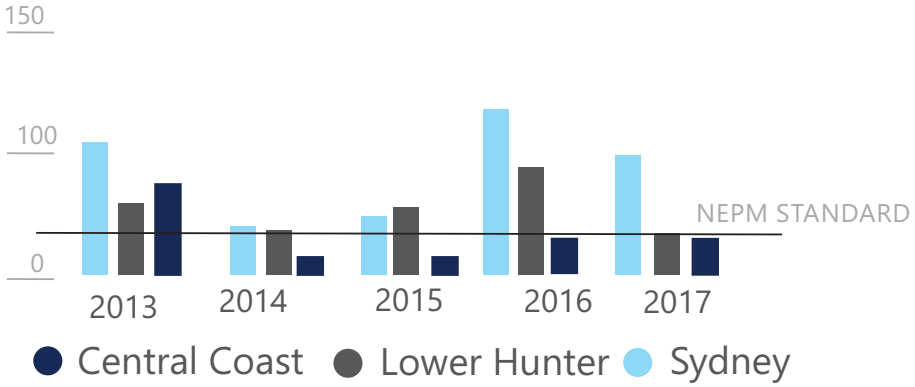


Figure 2: Annual maximum 24 hour average concentrations for particles ($PM_{2.5}$) in Sydney. Note: Readings above the line meet National Environment Protection Measure (NEPM) standard

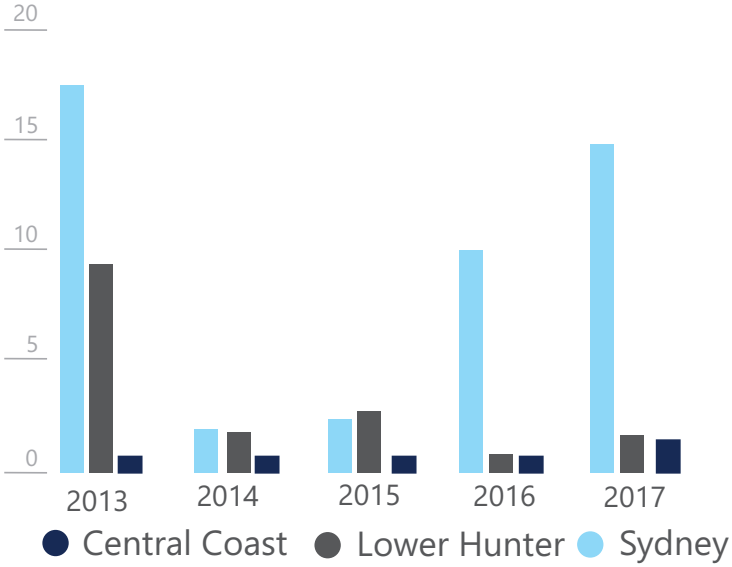


Figure 3: Number of days the Ambient Air Quality National Environment Protection Measure 24-hour standard for particles ($PM_{2.5}$) was exceeded in Sydney

Pressure

Airborne Particles

Airborne particles contribute to the quality of air, with the main particles that impact the Central Coast being:

- Woodsmoke
- Vehicle emissions
- Sulfur i.e. power generation, vehicle emissions, particle pollution
- Organic matter

Climate Change

Whilst it is not exactly known how climate change will affect the ozone and $PM_{2.5}$ changes in temperature may have role to play, with temperatures over pre-industrial times risen approximately 1 degree Celsius and expected to continue to rise in the 21st century. And with future rainfall patterns uncertain, it is expected that the frequency of dust storms and bushfires will be on the rise.

See the Climate and Energy chapter for more information.

Population

With the NSW population expected to rise to 9.9 million, and the Central Coast population projected to reach 414,615 by 2036, increased urbanisation and stress placed on the community will increase air pollution due to:

- Expanded transport infrastructure
- Increased activity from industry
- Increased household emissions i.e. woodsmoke, household chemicals
- New developments exposed to bushfire hazard reduction burns
- Higher population densities i.e. vehicle emissions.

Transport

During 2015-16 transport accounted for 20.8% of greenhouse gas emissions in NSW, and with increased population comes greater dependency on more efficient transport linkages. For example, during 2016-17, Sydney residents made 18.6 million trips each weekday with 69% by car.

Response

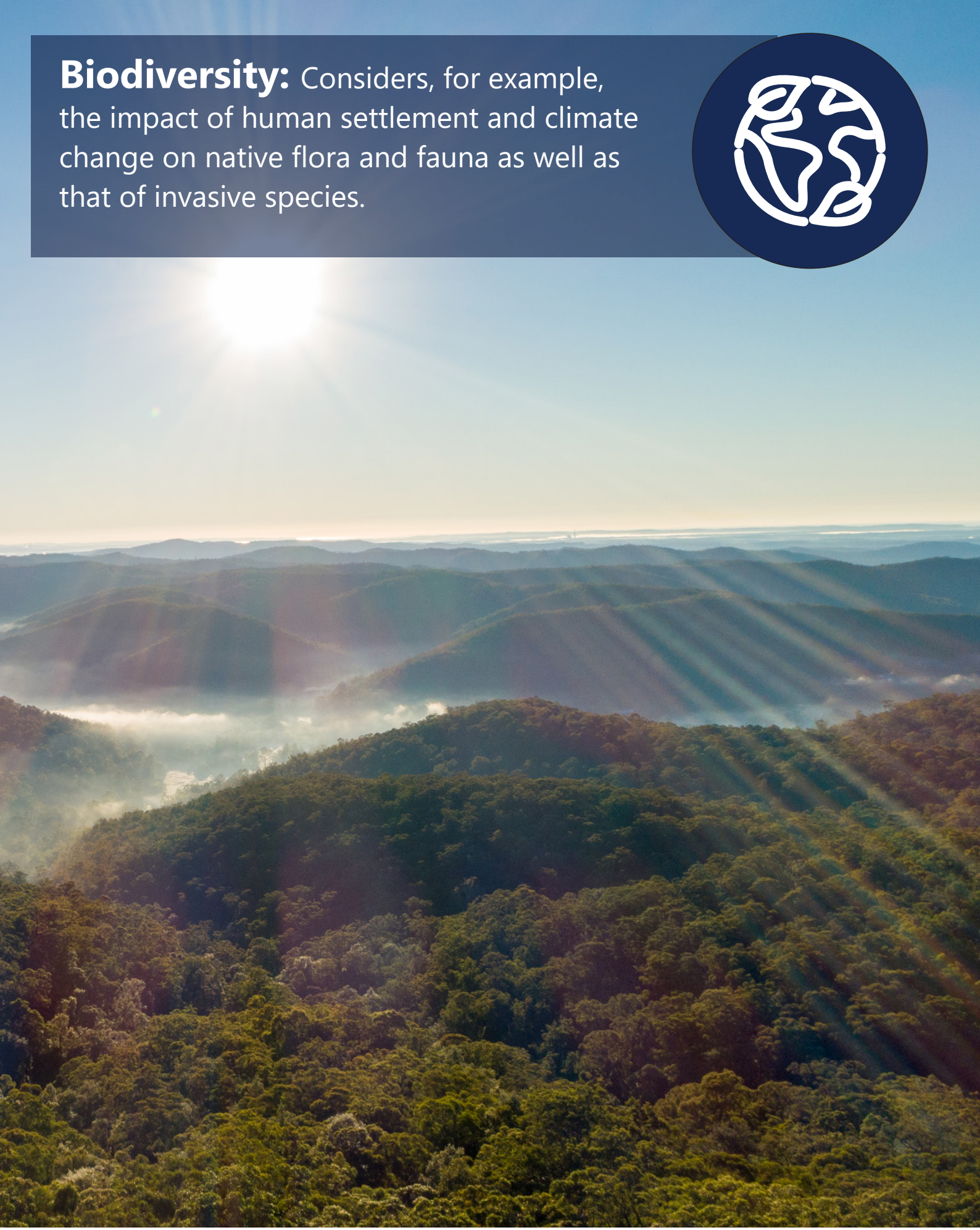
- Implement and integrate key environmental legislation and policy into Council work practices
- Keep the community informed of NSW government air quality monitoring activities
- Provide community education on air quality initiatives

25%
of species across the world are threatened with extinction

2,898
Central Coast flora species (native and exotic)

2,114
Central Coast fauna species (birds, mammals, reptiles, amphibians, insects and spiders)

Biodiversity: Considers, for example, the impact of human settlement and climate change on native flora and fauna as well as that of invasive species.



Biodiversity Introduction

Biodiversity refers to the variety of all life including plants, animals, fungi, insects and microorganisms, their genes and the ecosystems they form. Biodiversity is considered at three levels: genetic, species and ecosystem.

Nature across most of the world has now been significantly altered by multiple human drivers, with the great majority of indicators of ecosystem and biodiversity showing rapid decline. Globally, natural ecosystems have declined on average by 47% relative to their earliest estimated states and approximately 25% of species are already threatened with extinction (*The Global Assessment Report on Biodiversity and Ecosystem Services*; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPE), 2019).

Local government, along with federal and state government, non-government organisations, the private sector and community all play a role in the protection and management of Australia's environment and heritage. While local government plays a key role in local land use planning, state and territory governments have the primary responsibility for most land use planning and environmental protection. State and territory governments have specific environmental laws and programs designed to protect and manage the environment within their jurisdictions. The private sector and the community are important participants, particularly in managing land and property and investing in environmental management and restoration.

Progress Indicators Summary

Indicator	Status	Environmental Trend	Information Reliability
Number threatened species (flora)			**Reasonable**
Number of threatened species (fauna)			**Reasonable**
Number of Threatened Ecological Communities			**Reasonable**
Number of Priority Weeds on the Central Coast			**Reasonable**

Note: the flora and fauna ratings indicated in this table are based on the NSW Environment Protection Authority (EPA) State of the Environment Report 2018. The data is focused on all of NSW and is not Central Coast specific. The EPA's State of Environment Report advises that across NSW the number of species considered at risk of extinction continues to rise, with the number of threatened species increased by 26, or 3% in the three year leading up to December 2017. There are currently 1,025 species and 112 ecological communities listed as threatened under NSW legislation, including 77 species that are presumed extinct. Access to data continues to be a challenge for NSW and Central Coast, with the need to improve the monitoring and tracking the status of all species in NSW. For more information on the NSW EPA's State of the Environment Report 2018 visit: https://www.soe.epa.nsw.gov.au/all-themes

Status

The Central Coast extends from Hawkesbury River in the South to Lake Macquarie and the Watagan Mountains in the north, and from the forests of the Dharug National Park in the west to the coastline. Almost half of the LGA is in national park and state forest ownership. Of Council's land portfolio, approximately 6,000 ha of bushland is held primarily for the purpose of preserving natural and heritage values. Private land holdings make a substantial contribution to the conservation network.

Central Coast biodiversity includes:

- 2,100 native plant species
- 798 exotic plant species
- 384 native bird species
- 108 native mammal species
- 122 native reptile and amphibian species
- Over 1,500 species insects and spiders

The key legislation that guides the conservation and protection of various flora and fauna species and ecosystems includes:

- NSW Biodiversity Conservation Act 2016 and Biodiversity Conservation Regulation 2017.
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999

Council also has several environmental initiatives in place:

- Bushfire Management Plan
- Coastal Zone Management Plans
- Community Biodiversity Education Plan / Program
- Corporate Environmental Management System
- Flying-fox Management Strategy
- Natural Area Encroachment Management Strategy
- Nature-based Recreation Strategy
- Weed / Pest Management Program

Pressure

Pressures impacting the Central Coast include:

- Climate change
- Habitat loss, fragmentation and degradation
- Industrial and urban expansion
- Invasive plant and animal species, including disease
- Land use change
- Population growth (the Central Coast population is expected to reach 415,615 by 2036) causing increased traffic, pollution, resource use, and visitation to natural areas

Response

In response to the pressures listed above and to ensure protection and conservation of the Central Coast's delicate ecosystems, Council has developed a draft Biodiversity Strategy. The Strategy documents the Central Coast's biodiversity values, legislative protection context, with a corresponding action plan that sets out how the Strategy will be achieved and monitored against actions and defined targets. It is anticipated that the Strategy will be considered by Council for adoption mid to late 2020.

35 mega tonnes
of CO2-e produced by Central Coast residents each year

12%
of dwellings have a roof top solar system

27,000
megawatt hours generated from Council's waste management facilities

Climate and Energy: The effect of greenhouse gas emissions and what actions are being undertaken to reduce their impact.

Climate and Energy

Introduction

Climate change refers to any change in climate over time, due to either natural variability or as a result of human activity.

Emissions of Carbon dioxide (CO_2) and other greenhouse gases from human activity (including power generation, industry, transport and agriculture) are leading to a build-up of these gases in the atmosphere, trapping heat and leading to a more rapidly changing climate and an overall warming of Earth.

Climate change has begun to have impacts on many communities around the world, with future effects predicted to be more extensive and include more extreme weather events, increasing coastal erosion and inundation, impacts on ecosystems as well as on human health and wellbeing.

Global action is required to effectively counteract the effects of climate change, with reduction and mitigation of greenhouse gas emissions the first step in this process.

There is support from all levels of Government for action on climate change. Australia is a signatory to the United Nations Framework Convention on Climate Change (Paris Agreement), which seeks to hold the increase in global average temperature to 2 degrees Celsius or less. The NSW Climate Change Policy Framework (2016) sets a target of net zero emissions by 2050 and provides direction on how NSW will become more resilient to a changing climate (NSW EPA 2018).

Locally the Community Strategic Plan 2018-2028 identifies addressing climate change and its impacts as a key focus.

Progress Indicators Summary

Indicator	Status	Environmental Trend	Information Reliability
Central Coast Regional Greenhouse Emissions Profile		N/A	N/A
Central Coast Council's Corporate Greenhouse Emissions			Reasonable
Central Coast residential and non-residential electricity consumption			Good
Council energy consumption			Good
Number of solar energy customers			Good
% increase of renewable energy for Central Coast Council Operations			Reasonable

Status

Climate

The climate of the Central Coast is changing, based on long-term (1910–2011) observations, temperatures in the Central Coast Region have been increasing since about 1960, with higher temperatures experienced in recent decades. The number of hot days is predicted to increase, and the projections suggest there will be fewer cold nights. The warming trend for the Central Coast Region is of a similar order to the rate of warming projected for other regions of NSW (NSW OEH 2014).

Figure 4. Projected changes - Central Coast Climate change snapshot (NSW OEH 2014).

Emissions

Central Coast Region

The Central Coast Region Community Emissions Profile for 2016-17 identifies that collectively the Central Coast produces over 3.5 million tonnes of CO2-e (carbon dioxide equivalent) each year.

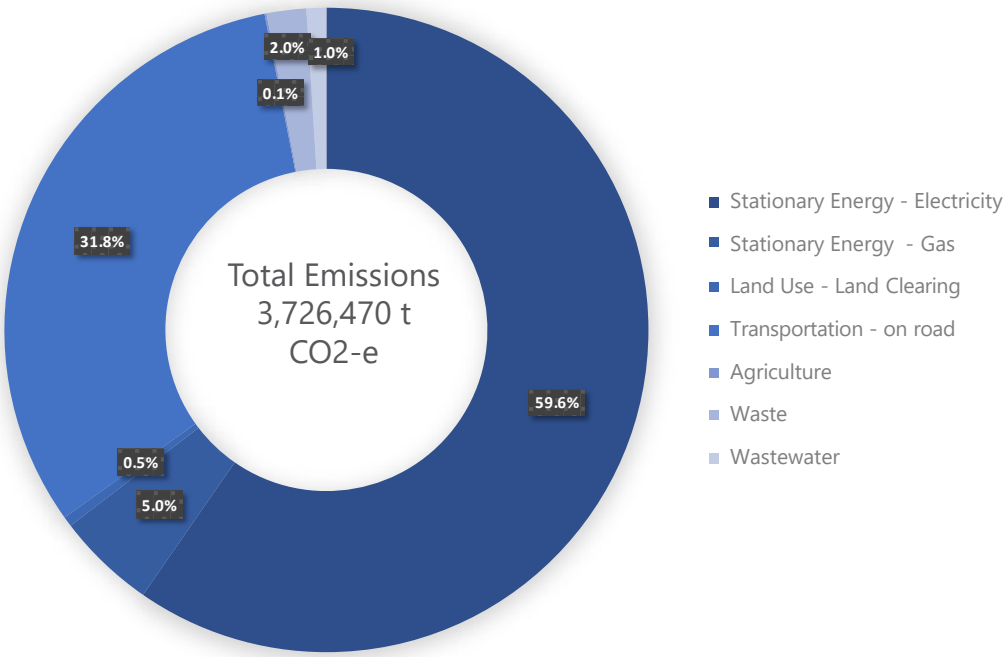


Figure 5 – Central Coast Greenhouse Gas Emissions by Source 2016-17 (Ironbark Sustainability 2019).

The largest source of community emissions by sector in Region is stationary energy from electricity, which accounts for approximately 60% (2,231 kt CO2-e) of total emissions and is mainly from electricity consumed by homes and businesses. The second highest source of emissions is on-road transportation, accounting for approximately 32% (1,180 kt CO2-e) of emissions.

Stationary energy from gas consumption accounts for around 5% of emissions, whilst agriculture accounts for less than 1% of emissions. Emissions from waste include greenhouse gases that are released as a result of the decomposition or treatment of solid waste and wastewater and this accounts for around 3% of emissions.

It is important to note that emissions from waste and wastewater are calculated on the Regional scale according to the volume of waste generated by the LGA, regardless of where it is disposed or treated. This differs from the way waste emissions are calculated in Councils Corporate Carbon Footprint (Figure 6) as the corporate inventory considers the operational or financial control of landfills and may include imported waste or exclude exported waste.

Source	Sector	Emissions t CO2-e
Stationary Energy - Electricity	Residential	856,518
	Commercial	338,849
	Industrial	1,035,754
Stationary Energy - Gas	Residential	61,648
	Commercial	19,723
	Industrial	118,089
Transport	On road	1,179,874
Waste	Landfill	75,879
	Wastewater	53,254
Agriculture		3,157
Land use	Land clearance	20,488
	Afforestation*	-36,763
Total		**3,726,470**

*Note Land use – Afforestation is presented as a negative to represent its positive influence on reducing emissions

Table 2: Central Coast Greenhouse Gas Emissions by Sector 2016-17 (Ironbark Sustainability 2019).

Central Coast Council

Central Coast Council contributed 189,000 tonnes of CO2-e to the regions total in 2016-17. This was reduced in 2017-18 by 2,000 tonnes to 187,000 tonnes, but has since risen to 199,000 tonnes in 2018-19, largely due to landfill emissions.

In 2018-19 more than 65% of Councils GHG emissions were from direct emission sources (direct emissions to the atmosphere from landfill and wastewater treatment sites), whilst 30% of Councils GHG emissions are associated with electricity consumption. Addressing these emission sources is a significant opportunity for Council.

As mentioned above the emissions data highlights that the focus of mitigation measures across the region should focus on the areas of energy consumption and on road transportation. Electricity consumption is also a considerable focus for Council to reduce its own corporate emissions but additional mitigation is also possible in the waste and wastewater areas.

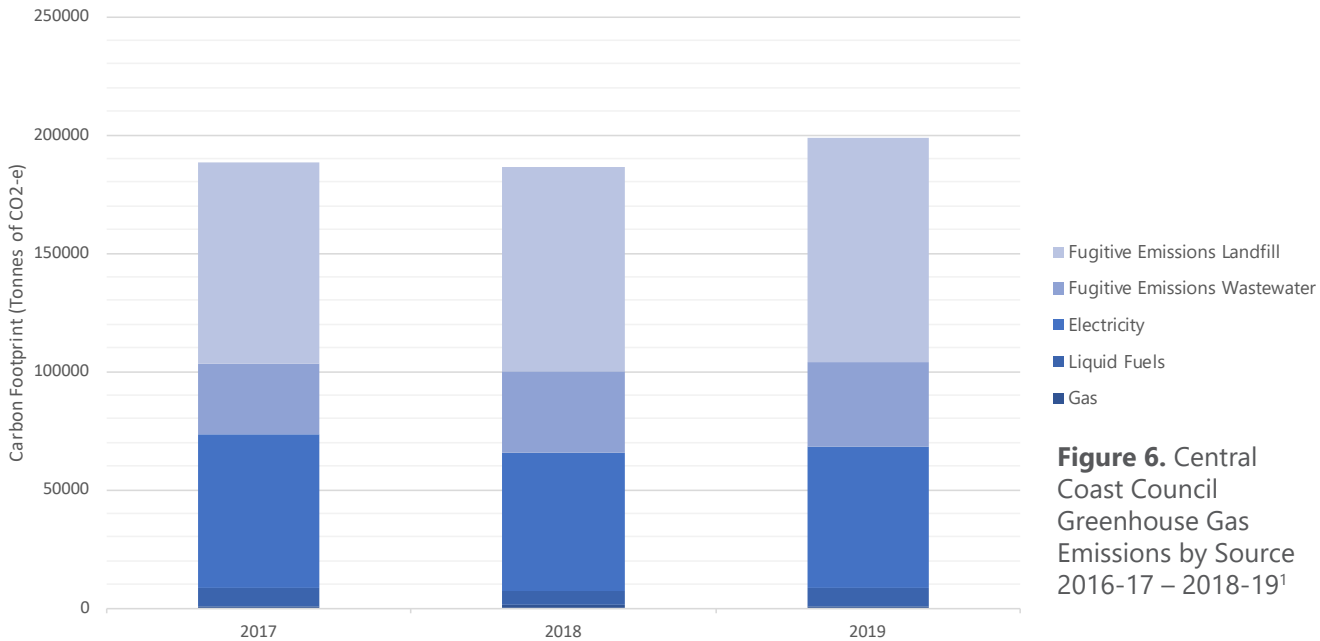


Figure 6. Central Coast Council Greenhouse Gas Emissions by Source 2016-17 – 2018-19[1]

[1]Assumptions and exclusions apply. Some of the data is estimated and is subject to change should improved data become available. Landfill gas emissions estimated according NGER methodology using best available data. Fugitive emissions from wastewater estimated according to NGER methodology where possible: due to data quality the accuracy for wastewater fugitive emissions is low. Electricity, gas and liquid fuel emissions calculated based on operational data and latest available published NGER emissions factors. Dataset includes Scope 1, Scope 2 and selected Scope 3 emissions (streetlighting). Excluded are Scope 3 emissions from solid waste transport and biosolids haulage.

Energy Consumption

Central Coast Region

Electricity consumption on the Central Coast remains fairly stable, however as illustrated in table 3, there has been a reduction in electricity consumption in the residential sector from 2016-17 to 2017-18.

This decreasing trend is likely due to higher electricity prices and the residential sector reducing their consumption through the uptake of energy efficiency measures.

Year	Residential Electricity Consumption						Non-residential small-medium sites (0-160 MWh pa)		Non-residential large sites (>160 MWh pa)	
	Daily average (kWh per customer per day)	MWh			Customer Numbers		MWh	Customer Numbers	MWh	Customer Numbers
		General Supply	Off Peak Hot Water	Total	Off Peak	Total				
2017-18	16.5	729,748	171,483	901,230	81,620	149,891	220,440	11,874	547,894	750
2016-17	17.1	750,526	175,870	926,396	81,922	148,370	227,452	12,031	542,899	763
2015-16	17.0	733,179	178,940	912,119	82,175	146,900	224,643	11,949	543,806	795

Table 3: Central Coast Electricity Consumption (Source: Ausgrid 2019).

Gas consumption has also decreased across the residential sector (figure 7), also likely due to pricing increases.

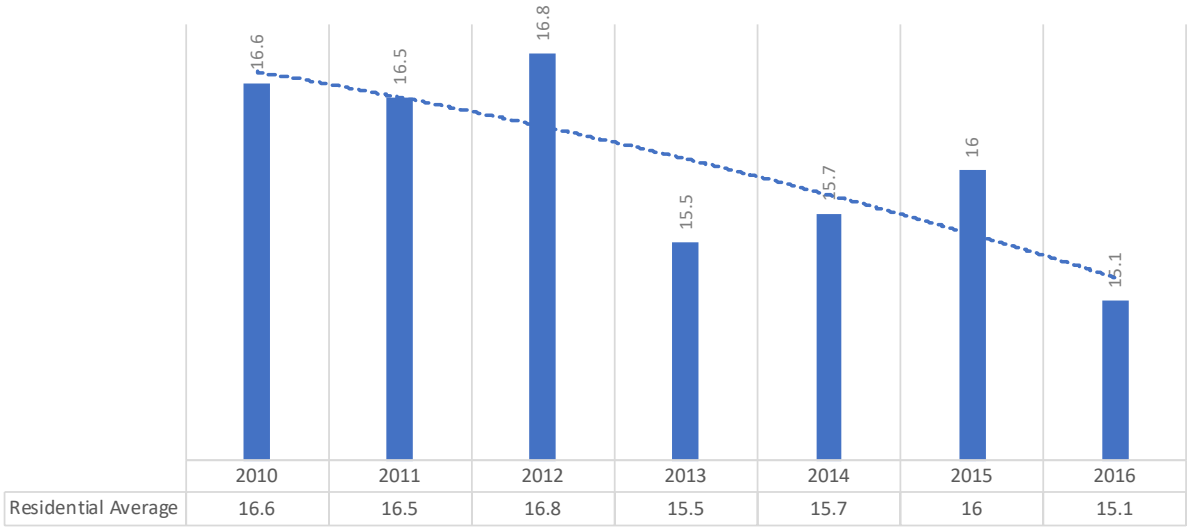
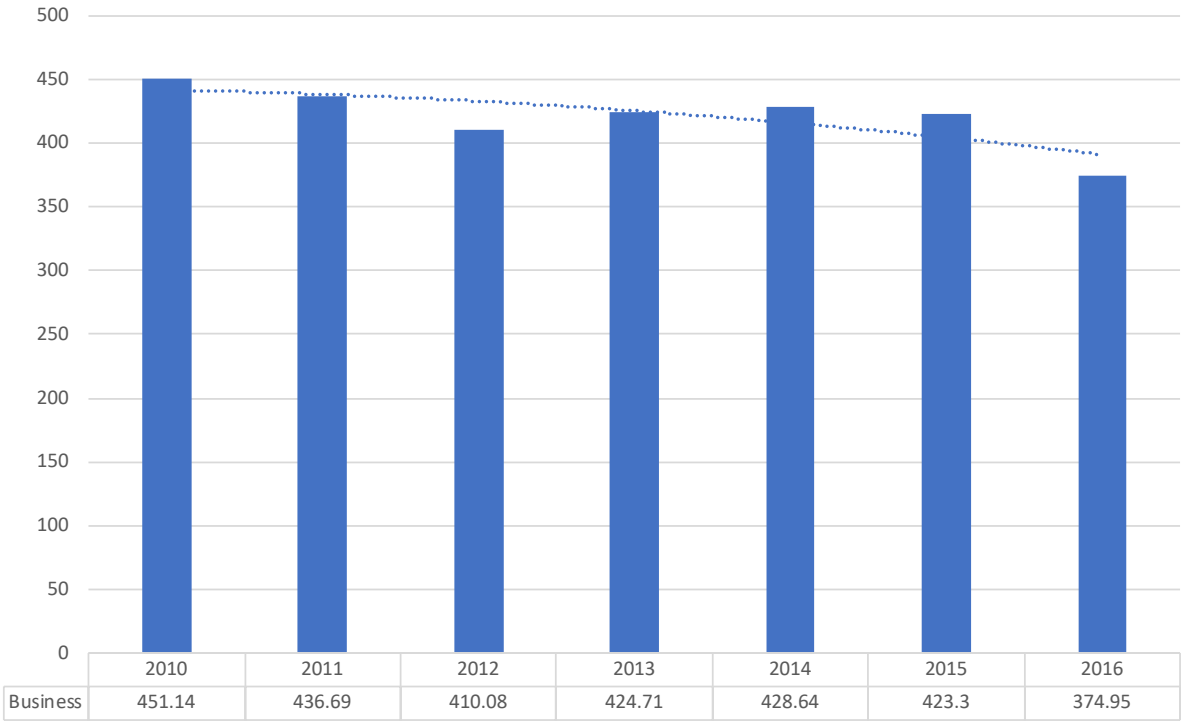


Figure 7: Residential Gas Consumption - Gigajoules (Source: Jemena 2016).

Energy consumption (both electricity and gas) in the business sector is more stable with a slightly decreasing trend in the small-medium sites for electricity consumption, and a slight increase in the large sites (table 3). Figure 8 highlights the fluctuations in gas consumption in the business sector, however the trend line indicates a slow decrease in consumption overall since 2010.



	2010	2011	2012	2013	2014	2015	2016
Business	451.14	436.69	410.08	424.71	428.64	423.3	374.95

Figure 8: Business Gas Consumption - Gigajoules (Source: Jemena 2016).

Central Coast Council

Central Coast Council has also been reducing its electricity consumption, with Figure 9 highlighting the sectors that Council has been able to target and reduce consumption.

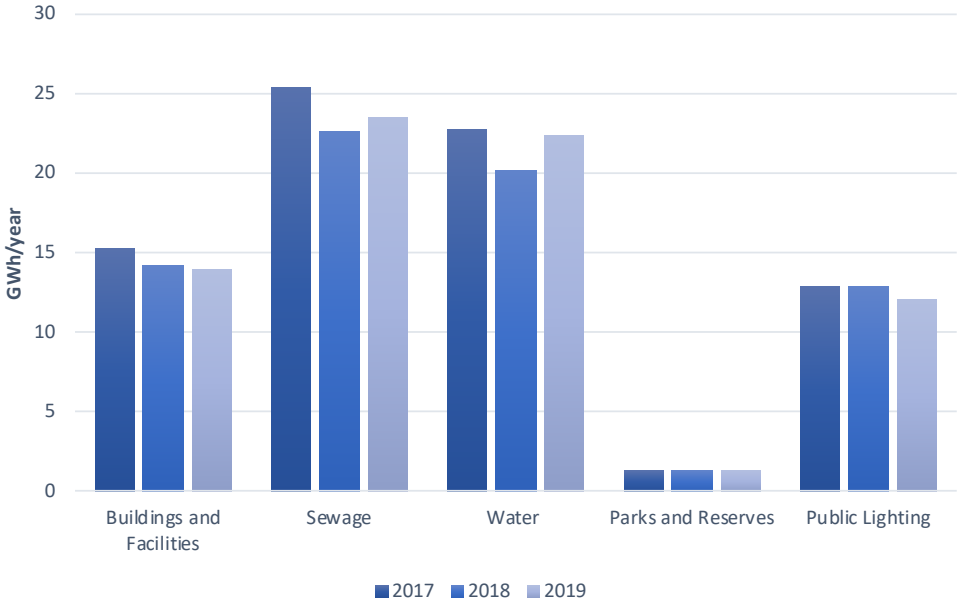


Figure 9: Central Coast Council's Electricity Consumption 2016-17

Renewable Energy

Central Coast Region

Residents and businesses on the Central Coast have actively taken up opportunities to invest in small scale solar systems, with approximately 12% of single dwellings having a roof top solar systems in place. The number of solar photovoltaic systems is growing each year on the Central Coast (Figure 10).

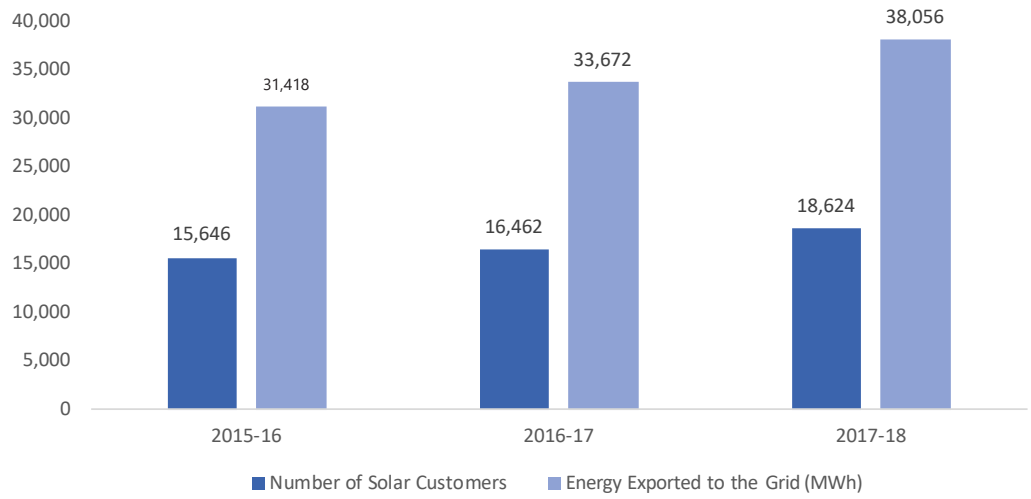


Figure 10: Energy Exported to the Grid (Source: Ausgrid 2018).

Central Coast Council

Council is also leading the way when it comes to renewable energy, installing over 600kW (kilowatts) of behind-the-meter solar since 2014, with another 1200kW on the way.

Landfill gas capture for subsequent flaring and electricity generation is currently undertaken across four waste management facilities where gas generation rates are both tangible and collection is practical. The landfill gas electricity generation infrastructure installed and managed at Council's waste management facilities is currently generating around 27,000 megawatt hours of reliable, base load renewable energy annually.

Council has saved an estimated $5.8 Million since 2012 through its energy management programs including the development of a suite of analysis tools, energy procurement and energy saving projects such as the installation of solar panels on Council buildings.

Pressure

Population

Populations across the globe continue to climb, with the Central Coast population expected to grow from 339,196 to 414,615 by 2036.

A higher population leads to an increased demand on resources including food, transport and energy. The production and consumption of these resources will result in more greenhouse gas emissions.

Energy Use and Transport

As indicated in Figure 2, energy consumption (derived from fossil fuels) is responsible for 64% of the regions greenhouse gas emissions with on road transportation the second highest emissions source. Population growth in the region will continue to drive emissions from these sectors unless appropriate measures and infrastructure is put in place to drive a reduction in emissions.

Impacts of Climate Change

The effects of the changing climate are being felt now, with extreme weather events, increasing temperatures, drought and bushfires. These impacts have direct implications on human health, our natural and built systems and Council's operations. How we cope with these changes will depend on our actions now, and how we plan into the future.

Response

Mitigation and Adaptation

There are two main strategies for response to climate change – mitigation and adaptation.

Mitigation of climate change describes the actions taken to limit or reduce the extent of global warming by reducing the levels of human induced greenhouse gas emissions, and the actions taken to remove greenhouse gas emissions from the atmosphere. Adaptation is the actions taken to reduce, moderate or adjust to the expected or actual negative effects of climate change, and take advantage of new opportunities.

For the Central Coast region, reducing emissions from energy consumption and on road transport present the best opportunity to mitigation action. For Council's own operations additional opportunities for mitigation exists for landfill operations and waste water treatment plants.

On the 8 July 2019 Central Coast Council adopted its first Climate Change Policy. This Policy sets a framework for climate mitigation, adaptation and ongoing resilience for the region using a place-based approach.

Through the Climate Change Policy, Council has also committed to the development of a Central Coast Climate Action Plan. This Plan will be developed with an extensive engagement process during 2020.

Mitigation

Central Coast Council recognises that action on Climate Change is not just a local issue, and as such is a partner to the Cities Power Partnership (CPP). This National Program is made up of 123 councils from across Australia, who are together working to make the switch to clean energy and to create climate resilient communities.

Through this Program, Council committed to undertake 6 Pledge Actions. These actions and the progress to date are as follows:

- **CPP Pledge Action A3 – Install Renewable Energy (Solar PV and Battery Storage):** Council will install 1.2 megawatts (1.2MW) of rooftop solar photovoltaic panels across 28 sites during 2020. This Project will add to Councils existing systems (600kW) and will provide approximately 2% of Council's electricity needs.
- **CCP Pledge Action A13 – Waste to Energy – Wastewater treatment plants:** Investigations are planned to review and upgrade monitoring points in accordance to National Greenhouse and Energy Reporting requirements in order to ensure accurate and up to date emissions monitoring. Accurate emissions data is needed in order to measure the impact of projects and initiatives and maintain efficient operation of each treatment plant.
- **CCP Pledge Action A14 – Landfill gas methane flaring or capture for electricity generation:** Landfill gas capture for subsequent flaring and electricity generation is currently undertaken across four waste management facilities where gas generation rates are both tangible and collection is practical. Planning is underway to identify opportunities for further improvement and expansion of the infrastructure at both Woy Woy and Buttonderry Waste Management Facilities.
- **CCP Pledge Action B3 – Public Lighting:** Council is working with the Southern Sydney Regional Organisation of Councils (SSROC) which oversees the Street Lighting Improvement Program and the Lighting the Way Program. Council and SSROC are currently identifying and developing the most appropriate model for replacement of existing Central Coast residential street lighting with energy efficient LED lighting to achieve energy efficient outcomes and emission reductions.
- **CCP Pledge Action C1 – Sustainable Transport - Electric Vehicle (EV) Fleet:** Council has an extensive Sustainable Fleet Program and are leaders in local government fleet provision. The following actions have been undertaken in response to this Pledge;
    - Council's first 100% electric vehicle, the Hyundai Ionic, was delivered and added to Council's car share fleet.
    - The number Council's total passenger vehicle fleet that are Hybrid vehicles has grown to 8%.
    - Council's first electric truck is currently being designed / specified for delivery in 2020-21.
    - Council's total truck fleet that are Hybrid trucks is steady at 2%.
    - Tier 4 emission standard is now set as a mandatory criteria in the assessment and purchase of heavy plant.
- **CPP Pledge Action D8 – Community Advocacy:** Through its Climate Change Policy, Council is committed to engaging with the community to develop local base placed Climate Actions and a Climate Action Plan. This process will be undertaken during 2020.

Adaptation

Council has undertaken a Climate Change Risk Assessment and is currently developing a vulnerability map for the region. This information will be integrated into Council's asset management program and will be considered in future infrastructure planning.

Council is preparing the following strategies and plans to provide direction:

- Disaster Resilience Strategy – the purpose of this Strategy is to provide strategic direction and embed emergency risks management into Council operation and build community preparedness.
- Greener Places Strategy – this Strategy aims to respond to our changing climate and the impacts of urban heat by encouraging tree planting.
- Biodiversity Strategy – this Strategy is currently in draft form and sets out the framework for conserving our natural ecosystems.
- Coastal Management Programs (CMPs) – CMPs being currently prepared for all coastline and estuary environments will identify and respond to coastal climate risks from sea level rise, coastal erosion and shoreline recession

8,420m²
of community gardens

1,358
Central Coast open space and recreation facilities

80
environmental volunteer groups

Land: Plays a significant role in the region, especially, for soil and natural ecosystems.

Land

Introduction

Land includes the natural environment, open space and recreation and the environmental volunteers that care for and carry out numerous land management activities.

The natural environment and vegetated landscapes are features that make the Central Coast a desirable place to live and visit. The lands that retain native vegetation consist of private land, Council owned and managed land, and state government managed land including national parks and state forests.

Open space and recreation provides community amenity for a variety of uses, from a walk in the local neighbourhood park to large multi-use district parks that provide a mix of recreation and sporting activities.

Council's Environmental Volunteering Program supports the community in caring for the natural environment through land conservation, bush regeneration, and other natural resource management activities.

Indicator	Status	Environmental Trend	Information Reliability
Adequate aquatic facilities are available			**Reasonable**
Adequate parks and playground facilities are available			**Good**
Abundant open space is available for community benefit			**Good**
Adequate sports facilities			**Good**
Number of environmental volunteer groups			**Good**
Number of environmental volunteers			**Good**
Number of hours contributed by environmental volunteers			**Good**
NSW EPA - Extent of native vegetation			**Reasonable**
NSW EPA - Levels of pressure on the condition of native vegetation			**Good**
Area replacement of native vegetation by weeds			**Reasonable**
Number natural asset reserves to accommodate infrastructure including recreational infrastructure			**Reasonable**

Status

Natural Environment

Council owns extensive areas of land classified as community and operational, as well as having the responsibility for the management of some Crown Land. There are many purposes of this land, with one of these to support native vegetation and conserve biodiversity.

Natural asset reserves are located across the Central Coast Local Government Area. They include larger reserves including Mount Alison Reserve at Jilliby, Kincumber Mountain Reserve at Kincumber, and the Rumbalara-Katandra Reserve at Gosford.

The Mangrove Creek Dam Catchment is an example where 101km^2 of land is reserved and managed to provide water to the Central Coast, but also serves to conserve biodiversity. The catchment area is dominated by native vegetation and provides a large area of relatively intact habitat for many species and vegetation communities. For more information visit: https://cdn.centralcoast.nsw.gov.au/sites/default/files/Mangrove_Creek_Dam_Brochure.pdf

The land that Council manages for the conservation of biodiversity occurs within the national parks on the Central Coast. There has been a history of Council and the National Parks and Wildlife Services working collaboratively to achieve biodiversity conservation outcomes on the Central Coast.

Open Space and Recreation

Council supports a healthy and active community, with sporting facilities, parks and reserves, and community gardens available across the Central Coast. These facilities include:

Facility	Type	Number
Netball Courts	Competition	71
	Training	29
Tennis Courts		119
Cricket Facilities	Turf wickets	13
	Synthetic wickets	44
	Cricket Nets	18
Sporting Facilities	Multi-use	77
	Hockey	5
	Regional	3
Skate Parks	Competition	2
	Passive	26
BMX Facilities		4
Fitness Stations		15
Parks and Reserves		490
Playspaces	Regional	11
	District	20
	Local	229
Aquatic facilities	Jetties	45
	Boat ramps	56
	Swimming enclosures	6

Community gardens include:

Garden	Members	Size m²
Bateau Bay Community Garden	20	1,090
Berkeley Vale Community Garden	15	365
East Gosford Community Garden	155	936
Green Point Community Garden	10	95
Gwandalan/Summerland Point Community Garden	36	1,476
Kariong Eco Garden	50	423
San Remo Community Garden	52	1,980
Woy Woy Community Garden	20	1,741
Kincumber Community Garden	10	314

Environmental Volunteers

The number of environmental groups within Council's Environmental Volunteer Program has remained stable for a number of years, with a maximum of 20 groups per officer within the Program, effectively capping the number of groups at 80. The Program is currently at capacity for the number of groups that it can support.

An analysis of the Program was carried out in 2019 and identified that the Program is diverse in nature, supporting groups that can be defined in terms of 4 distinct sub-programs:

Group	Details
Conservation groups	Volunteers carrying out bush regeneration activities
Amenity groups	Volunteers carrying out maintenance, rubbish and graffiti removal
Technical groups	Volunteers carrying out nursery activities, seed collection, citizen science
Short-term groups	Volunteers carrying out one off activities such as National Tree Planting Day, Floating Landcare, corporate events, etc

The analysis has led to the development of the Environmental Volunteer Program Strategy, which provides principles to guide the Program and actions for the future.

Pressure

Natural Environment

- **Clearing of land on the boundary edge of reserves by adjoining neighbours:** Council's natural assets are predominantly located in urban or semi-urban areas. This situation results in the natural asset having boundaries with thousands of residential properties. The presence of the residential properties adjacent to the natural assets leads to the loss of native vegetation and other impacts on the natural environment via several processes. Removal of shrubs and mowing of ground layer native vegetation is done by neighbouring residents to 'clear up' the reserve. In addition, Council is also ordered to establish asset protection zones or fire breaks on the natural asset reserves to reduce the risk of bush fire to the neighbouring residents. The asset protection zones are established to the NSW Fire Services standards and vary according to the location and vegetation type. While the asset protection zones are approved and necessary they result in the loss of native vegetation.

- **Fragmentation of native vegetation in the landscape that formerly maintained connectivity between the reserves:** Increasing urbanisation of the Central Coast has resulted in land use change and the loss of native vegetation across the LGA. Native vegetation land that is reserved, protected under a legally binding agreement for the protection of biodiversity or is within an environmental zone is vulnerable to being cleared for development or being modified through land usage change. As well as the loss of species and habitat associated with land clearing or vegetation modification this process results in fragmentation and loss of connectivity within the landscape. Maintaining connectivity between patches of native vegetation, including those within reserves is important for ecological functioning across the landscape and the long-term survival of native species populations. In some instances where connectivity has been broken between areas of core habitat revegetation works will be required to establish the native vegetation and facilitate the movement of target species.

- **Alienation of some natural asset reserves to accommodate infrastructure:** It is common practice for land that has been reserved for the protection of biodiversity to be developed for nature-based recreation infrastructure such as picnicking, bush walking and bike riding as well as ancillary infrastructure such as roads, parking areas and toilets. Additionally, bush fire trails are often established to provide vehicular access to undertake management activities and management of bush fire risk. The development of recreational infrastructure provides the opportunity for positive experiences that may develop appreciation of and value for the natural environment. Despite these potential positive benefits the alienation of native vegetation is usually required to develop the nature-based recreation infrastructure. Careful planning is required to minimise the potential environmental impacts of these recreational infrastructure. The location of many Council reserves are sought-after locations for the installation of telecommunications towers. Areas of native vegetation may also be seen as places to discharge storm water. Storm water that is high in nutrients can create conditions that favour weeds over native species and overtime result in the displacement of native species with weeds.
- **Disturbance of native vegetation by unauthorised activities:** The disturbance of native vegetation can result in its progressive degradation through weed invasion, soil compaction and soil erosion. The unauthorised development of walking and bike riding tracks through areas of native vegetation can result in the degradation of native vegetation and under some conditions can result in the fragmentation of the vegetation.
- **Replacement of native vegetation by weeds:** Native vegetation is prone to invasion by weed plants that are usually from other parts of Australia or in some instances from other parts of the world. Disturbed and fragmented native vegetation is particularly susceptible to the invasion of weed species. Weeds can establish and dominate to the extent that the natural regeneration of native species is disrupted.

Over time the lack of natural regeneration and uncontrolled weed invasion can result in some or most of the native plant community being lost. In such instances the long-lived canopy species may persist however without natural recruitment they too will ultimately be replaced by weeds, such as camphor laurel. The displacement of native species with weeds often means the loss of ecological resources, such as year-round food sources, required by animal species. Where the animals have specific food and habitat requirements the loss of plant species can see the local extinction of species of native animals. In addition to ecological impacts, weeds can also have social and economic impacts. For example, the loss of productive agricultural land to weed invasion can have a substantial economic impact for the landowner. The loss of amenity waterways can result in the invasion of aquatic species. Reduced recreational activities in weed impacted waterways can also diminish opportunities for social interaction.

Open Space and Recreation

The forecasted population growth and associated density will increase the needs and demands on the open space and recreation network. More open space will be required for people to recreate and socialise. The challenge is how to increase open space provision with a finite land supply that has many competing use and demands.

Environmental Volunteers

There is already a demand for additional volunteer groups within the Program, but with the projected population growth for the Central Coast this may result in a continued need to increase. However, any expansion of the Program will be dependent on Council resourcing.

Response

Natural Environment

- **Legislative Protections:** Council has established legislative protections over some natural asset reserves. These protections included the use of Property Vegetation Plans, Conservation Agreements, Biobanking Agreements. While these agreements remain in place, the legislation that they were established under has been replaced by the Biodiversity Conservation Act 2016.
- **Natural Environmental Reserves:** Central Coast has a large network of natural environmental reserves. This includes a variety of reserves that make up over 6,500 hectares.
- **National Parks:** The on-going collaboration with the National Parks and Wildlife Service has resulted in the transfer of several hundred hectares of land with environmental value from Council's ownership to the national parks estate. The transfer of Council land to the National Parks and Wildlife Service has been done to establish Wambina Nature Reserve and to make additions to Bouddi and Brisbane Water National Park as well as to Cockle Bay and Wamberal Lagoon Nature Reserves.
- **Bush Regeneration:** Management plans have been prepared for natural asset reserves to guide their management. The annual bush regeneration program is undertaken in natural reserves in accordance with these Plans. In addition to the professional bush regeneration works contracted by Council, community volunteers engaged in Council's Environmental Volunteering Program are active across many of these natural asset reserves and other land.
- **Urban Encroachment**: Council has prepared a draft Encroachment Management Strategy that identifies a procedure for managing encroachments on natural asset reserves. This draft Strategy will guide the management of encroachments across Council's assets. The employment of a dedicated Encroachment Officer will assist in engaging with neighbours to reduce the impacts of encroachments and unauthorised usage on natural asset reserves.
- **Habitat Management:** Council has prepared corridor mapping for the LGA which identifies linkages between areas of core habitat and Council's natural asset reserves and other land. This corridor mapping will guide the retention and future reestablishment of broken connectivity between core habitat and these areas.

Open Space and Recreation

To ensure the continued provision and management of open space and recreation across the LGA Council is preparing the following strategies and plans:

- Skate Strategy
- Tennis Strategy (in partnership with Tennis NSW)
- Dogs in Open Space Strategy
- Active Lifestyle Strategy
- Playspace Strategy

Environmental Volunteers

Opportunities to expand the Program have been outlined in the Environmental Volunteer Program Strategy.

9%
use the bus or train

Private Motor Vehicle
use is increasing on the Central Coast

Transport: How we get about on the Coast is important in terms of connectivity whilst ensuring future infrastructure is managed in an environmentally and sustainable manner bringing communities together.

Transport

Introduction

Transport plays a key role in allowing people and goods to get from one place to another. However, vehicles, road, freight and infrastructure can have environmental impacts.

Private motor vehicles remain the dominant mode of transport in NSW, accounting for 69% of all trips by Sydney residents and over 80% of trips by Central Coast and Hunter residents.

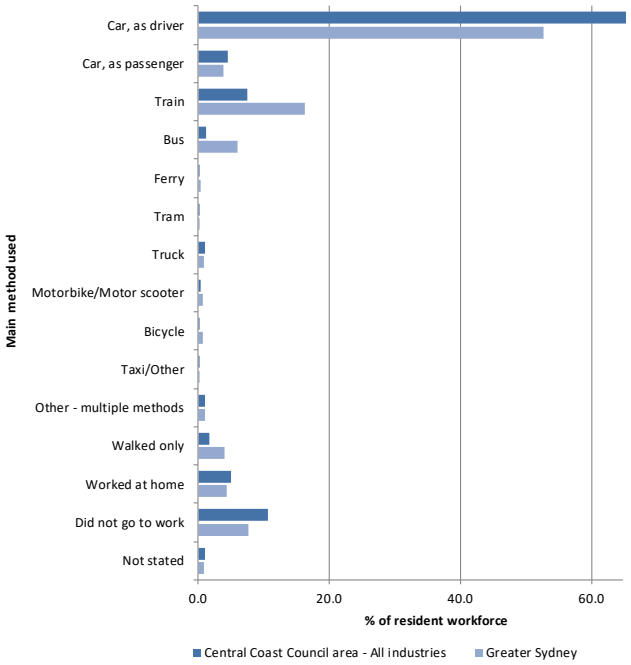


Figure 11: Resident Workers Method of Travel to Work 2016

Progress Indicators Summary

Indicator	Status	Environmental Trend	Information Reliability
% Increased use of Public Transport around the Central Coast Local Government Area			Good
Road network provides for efficient traffic flow			Good
% of persons that use other means for travel other than public transport on the Central Coast			Good
Public transport is adequate for travelling outside/ beyond the Central Coast			Reasonable
Resident workers method of travel to work			Good
% of persons cycling to work			Good

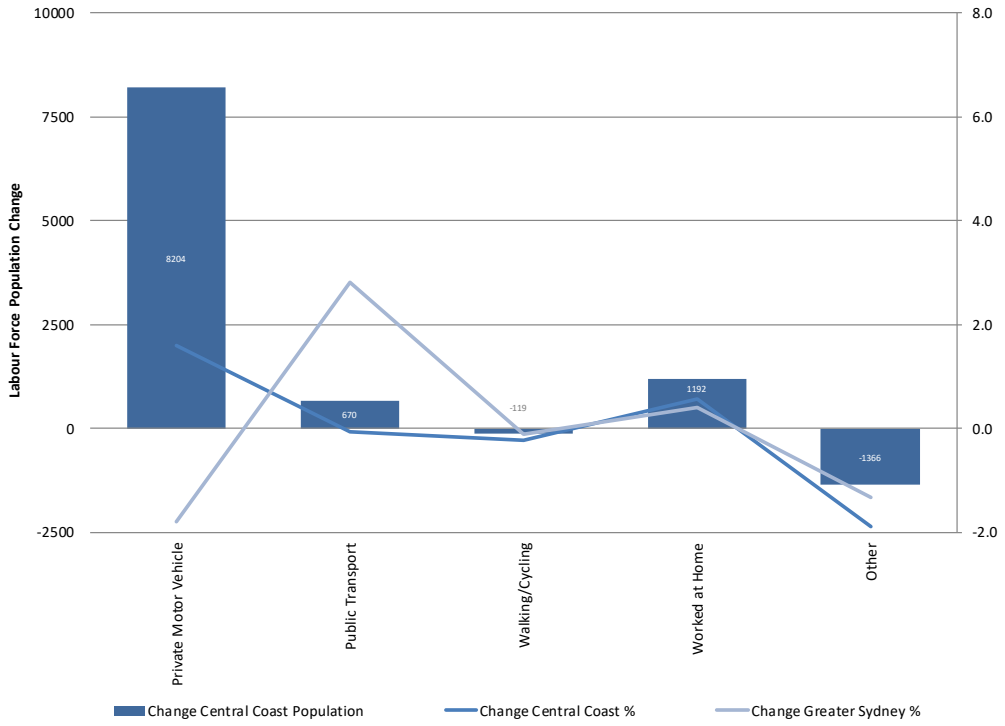


Figure 12: Change in transport method to work on Central Coast 2011 to 2016

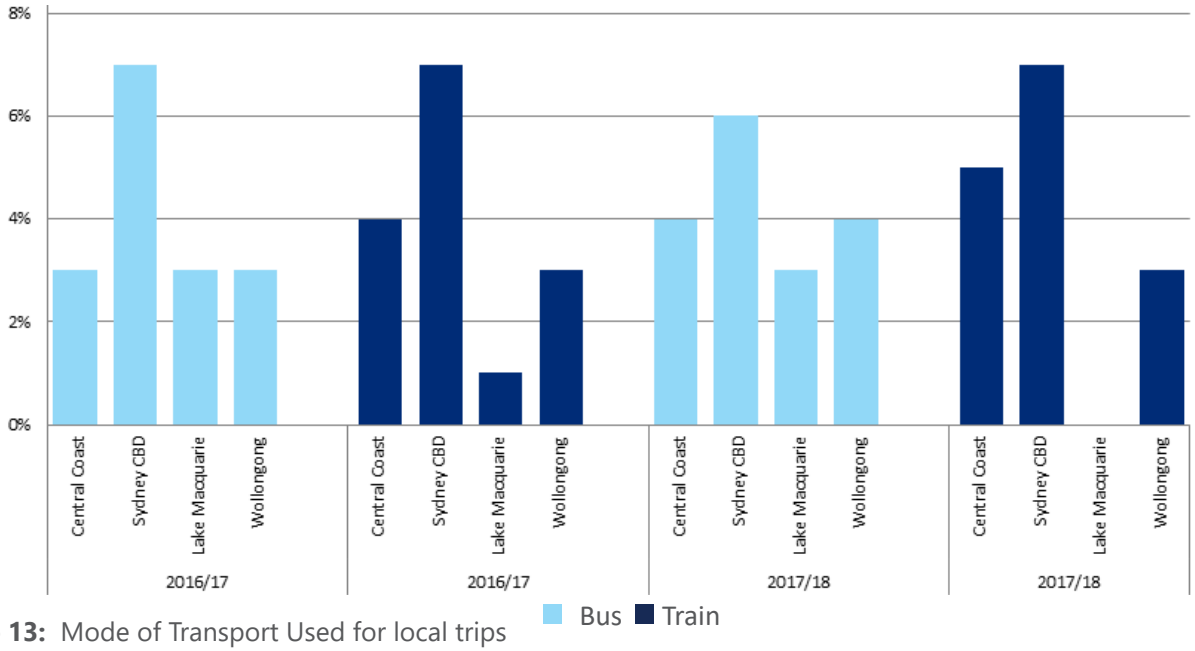


Figure 13: Mode of Transport Used for local trips

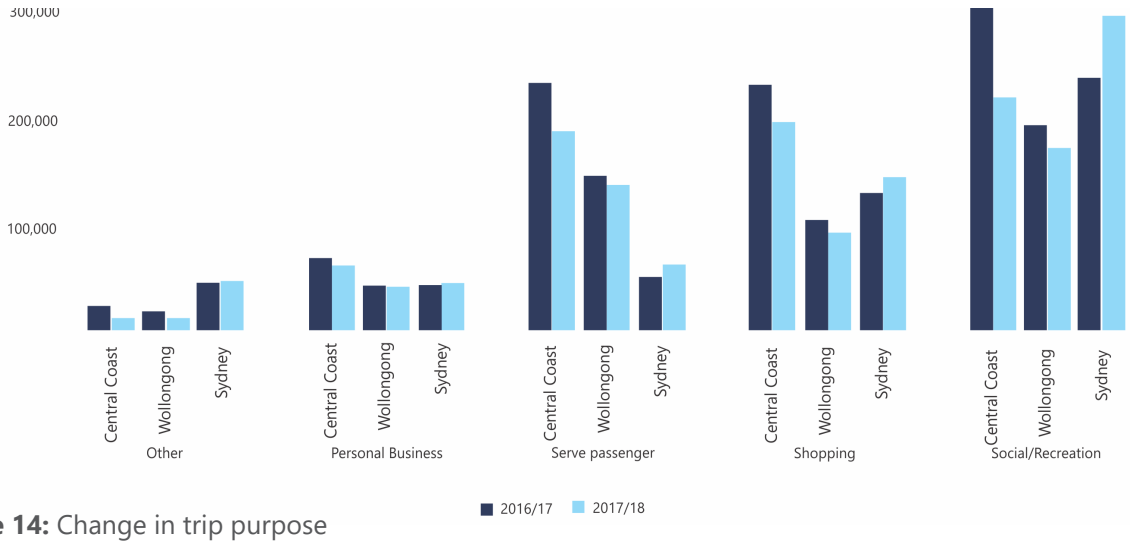


Figure 14: Change in trip purpose

Status

The Central Coast region is overwhelmingly reliant on private vehicles and to a lesser extent reliant on public transport (Figure 12), with the Central Coast slightly behind Greater Sydney (Figure 11). The mode of transport for local trips is slightly favoured by train (Figure 13), whilst the reason for trips other than for employment and education has dropped slightly in 2017/18 (note: Serve Passenger is the drop-off, pick-up or to accompany another person).

A range of initiatives being delivered under Future Transport 2056 encourages travel by public and active transport (such as walking and cycling), rather than by private car, which will help reduce traffic congestion and greenhouse gas emissions. Air quality and emissions are also being addressed through new vehicle standards and vapour recovery programs

Pressure

The Central Coast population is projected to reach 414,615 by 2036, with over 9 million projected for NSW for the same period. This will place a greater strain on transport and associated infrastructure, including:

- An increase in passenger demand for public transport
- An increase in the number of private vehicles
- More traffic on the roads and increasing congestion
- More goods moving around the State.

The consequences of these changes, if not well managed, include:

- More noise and air pollution
- Increased production of greenhouse gases
- Reliance on non-renewable resources for fuel
- Increased crash risk
- Increased road trauma

Response

NSW Transport Strategy 2056

NSW Transport has developed Future Transport 2056 which directs how the state government will maintain and create a world class, safe, efficient and reliable transport system over the next 40 years.

Future Transport 2056 acknowledges the vital role transport plays in the land use, tourism, and economic development of towns and cities. It includes issue-specific and place-based supporting plans that shift the focus away from individual modes of transport, toward integrated solutions.

The long term vision and place based planning will support the economy by giving industry and communities the certainty they need for their own plans and decisions about where to invest, locate and live.

An efficient transport system, results in greater economic performance, enabling businesses to reach new markets, attract new investment, while presenting more job and training opportunities. By contrast, congestion and network inefficiency increase costs, constrain growth, and stifle economic development and the mobility of services and labour.

Within the Strategy, more than 500 new intercity train carriages will replace older train carriages on services from Sydney to Canberra, Sydney to the Central Coast, Newcastle, the Blue Mountains and the Illawarra with the first of the 500 New Intercity Fleet carriages are to delivered in 2019.

Investigations are also underway for the provision fast rail network to the Central Coast, Newcastle, Canberra and Wollongong.

Central Coast Regional Plan 2036

The NSW Department of Planning, Industry and Environment has developed the Central Coast Regional Plan 2036 which aims to build a strong economy capable of generating jobs, providing greater housing choice, essential infrastructure, lively centres for shopping,

entertainment and dining, and protecting the natural environment. The plan includes the need for and identified:

- More funding for regional transport infrastructure
- Targeted growth in strategic centres and growth corridors close to transport to deliver social and economic benefits
- The proximity to Greater Sydney and Newcastle, boosted by investment in transport infrastructure, has made it possible for residents to access a wider variety of jobs and services both within and beyond the region
- Some communities are better connected by an integrated transport system that prioritises cycling, walking and public transport
- The proximity to the Sydney and Hunter regions and connections to both regions via the M1 Pacific Motorway, the Pacific Highway and the Main Northern rail line are regional assets. In the longer term, opportunities for greater connectivity may emerge, including high-speed passenger rail and improved water transport opportunities.
- Precinct planning will identify opportunities to grow and support the revitalisation of city centres. The focus will be on improving amenity, integrating transport (including walking and cycling routes), encouraging higher-density housing within walking distance of the city centres and delivering community infrastructure
- Undertake and integrate precinct planning for Gosford Waterfront, Arts and Entertainment, Railway and Hospital precincts
- Promote Warnervale as a new strategic centre on the Central Coast and plan for its transport interchange.
- Leverage the planned Pacific Highway upgrade and new Link Road to improve transport connectivity and amenity along the Tuggerah to Warnervale corridor
- Harness opportunities for business investment and employment by leveraging major public transport investment and projects
- Enhance the competitive value of the region by encouraging business and employment activities that leverage the major inter-regional transport connections to Sydney and the Hunter regions
- Support the region's urban areas with more open space, recreation, walking, cycling and public transport opportunities to encourage more active, healthy lifestyles.

168,243
tonnes of waste by Central Coast residents in 2018-19

69,732
tonnes of waste recovered/ recycled in 2018-19

70%
land fill diversion is the State wide target

Waste: How effectively waste is managed, for example, diverting suitable waste from landfill and finding other uses through recycling or using waste for other purposes can be challenging.

Waste

Introduction

Waste management in Australia is in transition. The pressures on recycling, plastic pollution, over-consumption, single-use convenience, food waste and illegal dumping are firmly in the public eye, while aspirations around protection of the environment and health have never been higher. A sophisticated and flexible approach to dealing with these challenges is critical.

At the same time, it is true that the foundations of the way Central Coast manages waste remains solid and we must take care not to overstate the risks. The Central Coast is well supplied with established waste management facilities incorporating long-term disposal capacity whilst also being well served by a number of locally-based waste management companies with track records in developing end markets for recycled materials. This includes having a 10-year domestic waste collection contract with one of Australia's largest waste management companies, and also one of Australia's largest composting and soil conditioning companies operating at Council's waste management facilities.

The fundamentals are sound, with the challenge in how we navigate the evolving dynamics at international, national, state and local scales.

Progress Indicators Summary

Indicator	Status	Environmental Trend	Information Reliability
Waste generated per capita			**Good**
Waste recycled through the yellow-lid recycling bin			**Good**
Waste recycled through the green-lid recycling bin			**Good**
% of waste recycled			**Good**
Waste put out for kerbside collection			**Good**

Municipal Waste Flows

Across all household collections on the Central Coast, residents generated 168,243 tonnes of waste in 2018-19, of which 59% (98,511 tonnes) was sent to landfill and 41% (69,732 tonnes) was recovered. Another 106,763 tonnes of drop-off material was received at our three waste facilities.

Total waste generation fluctuated between 2011-12 and 2017-18, with a peak in 2014-15 due to a spike in bulk and garden waste following severe storms that caused extensive property damage and tree loss.

General waste from the red bin has remained relatively constant over the last five years, whilst recycling volumes have declined. The reduction in recycling volumes has reduced the overall landfill diversion rate by 3% over the last five years. This decline is almost certainly a direct result of the reduced newsprint and the positive redirection of items to the NSW Container Deposit Scheme.

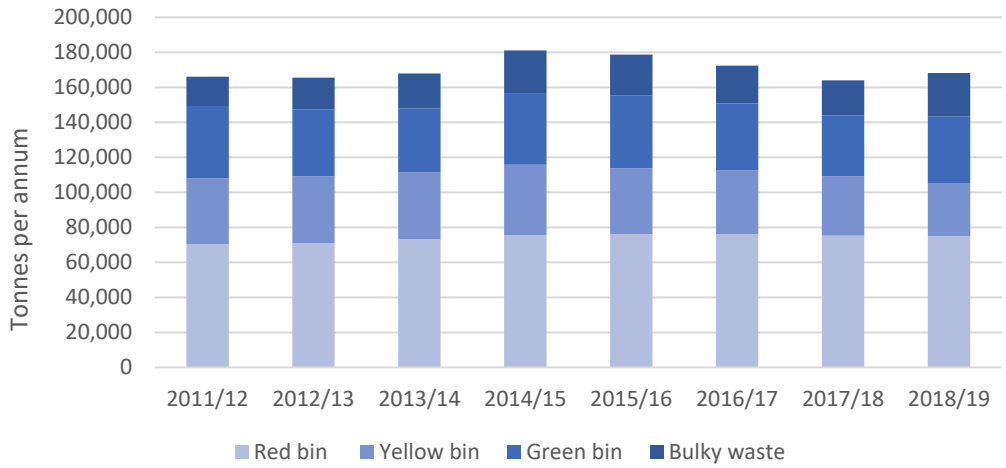


Figure 15: Total Waste and Recycling Collected by Council

To make further tangible improvements towards reducing the amount of waste going to landfill, the Central Coast will need to look further towards reducing the volumes of red bin general waste and bulk waste materials generated and opportunities to recover materials from these waste streams and extract value.

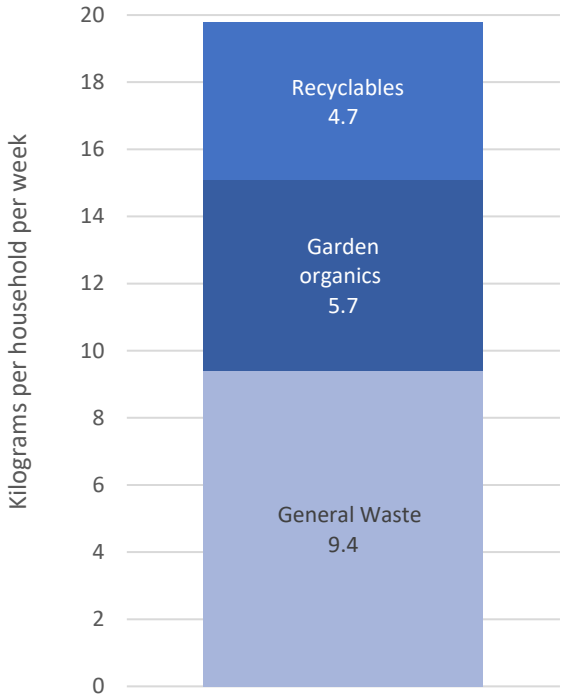


Figure 16: Typical Kilograms of Kerbside Waste per Household per Week

Status

Waste policies are ever evolving and adapt to reflect the changing industry. Planning for waste management should consider both well-established principles and emerging trends. Governing bodies will be required to be responsive and agile as waste management becomes more challenging and the community becomes more alert to issues and impacts of waste.

Federal:

- National Waste Policy 2018
- National Packaging Covenant
- National Packaging Targets
- National Food Waste Strategy
- National Television and Computer Recycling Scheme

State:

- Protection of the Environment Operations (POEO) Act 1997 and Waste Regulation 2015
- NSW Waste Avoidance and Resource Recovery (WARR) Strategy and 2020-21 targets
- NSW 20 Year Waste Strategy 2020 (currently in development)
- Energy from Waste Policy Statement
- NSW Circular Economy Policy Statement
- Return and Earn Container Deposit Scheme (CDS)

Regional:

- Local governments may join an urban Regional Organisation of Councils (ROCs) or non-urban Voluntary Waste Management Groups (VWMGs)
- In early 2017, Central Coast Council participated with the Hunter Joint Organisation of Councils, to develop the Hunter / Central Coast Regional Waste Avoidance and Resource Recovery Strategy 2017-2021

Local:

- Local government provides waste education to the community to inform waste behaviours and ensure residents know how to use the waste systems provided
- Councils are responsible for collection, treatment and disposal of municipal waste (through in-house operations or contracted services), including kerbside, council-generated and illegally dumped or littered waste
- Councils are encouraged to meet state targets (with some state funding for waste programs), however each councils' appetite to meet these targets is usually a function of their politics and priorities and the available infrastructure and services
- A strategic response through the Community Strategic Plan (CSP) 2018-2028 has been the development of the draft Waste Strategy. The CSP details the community aspirations whilst the Waste Strategy operationalises the CSP and details Council's approach to achieving the aspirations. Ongoing education is key to our green approach, as is inviting the community to take a hands-on role in conservation, protection and remediation of our environment. Reducing litter, minimising waste and championing renewable energy in our future design and planning will minimise the impacts of climate change in our region and will enable the preservation of our beaches, waterways, wildlife corridors and inland areas for the variety of species that inhabit them.

Pressure

Population

Population growth on the Central Coast has been steady over the last decade at an average 0.914% per year. There are more than 130,000 residential premises in the LGA, predominately comprised of stand-alone houses (76.6%), followed by medium density homes (18.3%) and a small proportion of high-density dwellings (3.4%).

However, density is growing. By 2036 the population is expected to grow by 19.67% to 414,615 people, with an additional 41,500 dwellings needed to meet this new demand, including a higher proportion of residents living in multi-unit dwellings. This increase in population brings with it a corresponding increase in waste generation, which needs to be addressed.

Community Expectations

Through the development of the draft Waste Strategy Council undertook an extensive multi-tiered consultation process with the community in mid-2019, engaging the community via workshops, pop-up information sessions, surveys, online quizzes and promotion through both traditional and social media.

It generated a high level of interest, with more than 1,300 surveys completed and 151 residents attending the four workshops to have their say. The was very clear in its views about the goals and issues around managing waste and resources. Almost 90% of surveyed residents rated reducing waste to landfill as 'very important'.

Decreased Overseas Recycling Markets

Waste has largely been managed out of sight, out of mind, with the majority of end markets for recycling streams being domestic industrial uses or exported to the growing manufacturing countries of Asia.

This practice is no longer fit for purpose. Recycling markets have been under pressure since China and other Asian countries stopped importing mixed recyclable material in 2018, which in time will be superseded by a ban the federal government intends to introduce on exports of low-grade mixed recyclables. This has brought the circular economy very much front of mind.

Response

In response to these waste pressures, Council now supplements road construction with roads constructed from recycled plastic, glass, toner cartridges and tyres transformed into road construction product. This saves thousands of tonnes of waste going to landfill.

Council has also prepared its very first draft Waste Strategy, which includes the following vision, priorities, objectives and actions.

Vision: To prioritise waste avoidance, recognising waste as a valuable resource and using it to create a sustainable Central Coast, with positive economic, social and environmental outcomes.

Priorities:

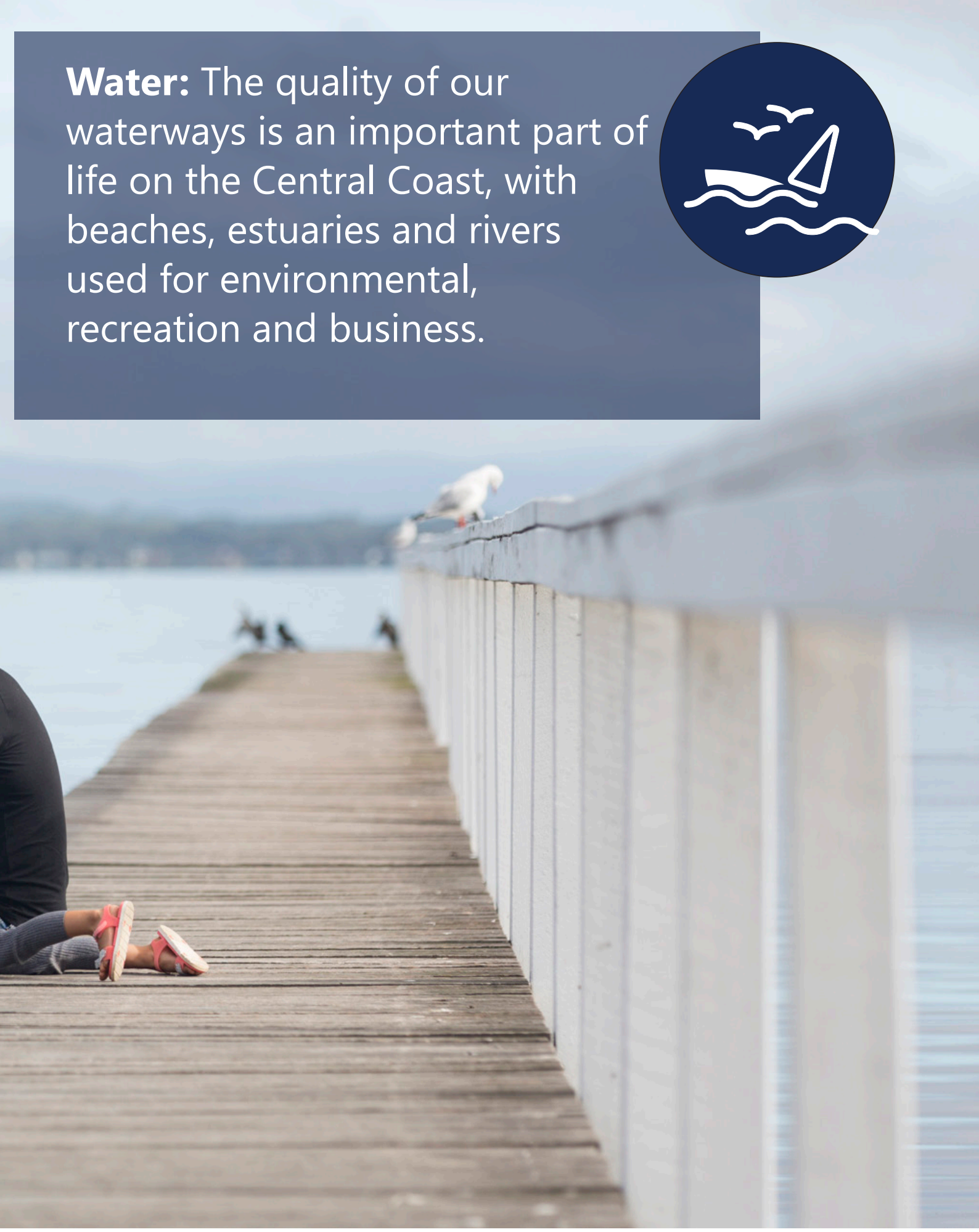
- Reduce the waste generated on the Central Coast
- Reduce the waste landfilled on the Central Coast
- Increase recycling options available on the Central Coast
- Explore funding opportunities to assist with achieving waste avoidance and diversion

75%
of coastal estuaries, lagoons and creeks were considered 'good' or 'excellent' in 2017-18

50%
of natural swimming sites graded 'good' or 'very good' in 2018-19

4 out of 16
Significant Open Coast Locations in NSW with high erosion risks on the Central Coast

Water: The quality of our waterways is an important part of life on the Central Coast, with beaches, estuaries and rivers used for environmental, recreation and business.



Water

Introduction

The Central Coast has a diverse natural waterway environment - that includes rivers, creeks, wetlands, lakes, estuaries, lagoons and beaches. Collectively, the coastal catchments, estuaries and coastline areas are the Central Coast's greatest natural asset.

Natural waterways and the coastal zone provide a multitude of values and uses, which contribute to the quality of life of our community. For example, estuaries provide important habitat for endangered ecological communities, while sandy beaches provide scenic and accessible areas for recreation.

These natural waterways are exposed to a range of pressures which can impact their long-term health and sustainability. These pressures are ever present and increasing, with population growth, climate change and pollution threatening the ecological health and recreational amenity of the waterway and coastal environment.

On the Central Coast, waterway areas from the catchment to the coast are also exposed to natural hazards which can impact on the built environment and community. Large storms can drive catchment flooding, coastal inundation and beach erosion. Council undertake a wide range of strategic, operational and community activities to mitigate threats to the natural waterways and coastal environment in accordance with relevant legislation.

Progress Indicators Summary

Indicator	Status	Environmental Trend	Information Reliability
Ecological heath – Southern Lake Macquarie*			**Good**
Ecological heath - Tuggerah Lakes estuary*			**Good**
Ecological heath – Central Coast lagoons*			**Good**
Ecological heath – Brisbane Water*			**Good**
Ecological heath – Lower Hawkesbury*			**Good**
Recreational water quality – ocean beaches*			**Good**
Recreational water quality – ocean baths**			**Good**
Recreational water quality – lake/lagoon**			**Good**
Recreational water quality – estuarine (bath) sites**			**Good**

* Refer to Waterways Report Card for specific results

** Refer to Central Coast Beachwatch Report Card for specific results

Status

Legislation and Policy Frameworks:

The primary legislation that guides management of the natural waterways and coastal zone includes:

- NSW Coastal Management Act 2016
- NSW Marine Estate Management Act 2014

The below legislation and policy are also important:

- NSW Environmental Planning and Assessment Act 1979
- NSW Fisheries Management Act 1994
- NSW Protection of the Environment Operations Act 1997
- NSW Water Management Act 2000
- NSW State Environmental Planning Policy (Coastal Management) 2018
- NSW Coastal Management Manual 2016
- Marine Estate Management Strategy 2018–2028
- NSW Government Flood Prone Land Policy
- NSW Floodplain Development Manual 2005

Ecological Health

Council monitors the ecological health of the lakes, estuaries, rivers, creeks and lagoons to evaluate condition, measure change through time and target investment and on-ground works to improve ecosystem health. A healthy waterway is one that supports natural processes, is resilient to change, can recover from human impacts, and is relatively stable and sustainable through time.

The inaugural (and most current) 2017-18 Waterways Report Card for the Central Coast identified the following key outcomes which reflect the ecological health status of these coastal estuaries, lagoons and creeks:

- Of the 32 sites monitored, 75% were considered ‘good’ or ‘excellent’
- Brisbane Water estuary is generally considered 'excellent'
- Water quality throughout the Tuggerah Lakes estuary was generally 'good', with a pocket of 'fair' results for Budgewoi Lake
- Coastal lagoons vary from 'excellent' at Cockrone Lagoon to 'very poor' at Avoca Lagoon

Council aims to raise awareness about the state of the waterways, and the pressures that affect ecological health to the community, by reporting the ecological health monitoring results. The Waterways Report Card is published annually on Council’s website: www.centralcoast.nsw.gov.au/waterwayhealth

Figure 17: Brisbane Water ecological health grades summary 2017-18

Figure 18: Tuggerah Lakes ecological health grades summary 2017-18

Figure 19: South Lake Macquarie ecological health grades summary 2017-18

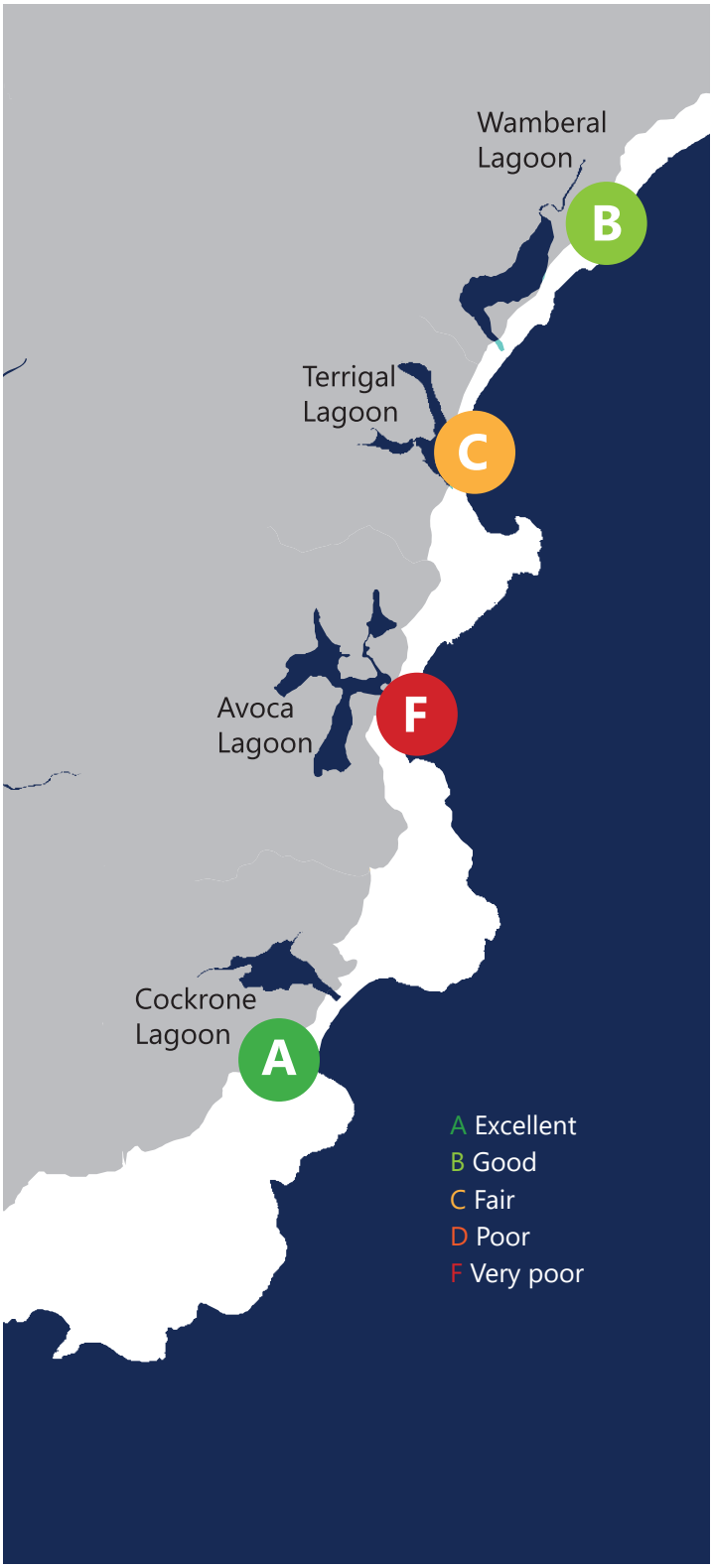


Figure 20: Coastal Lagoons ecological health grades summary 2017-18

	Brisbane Water	Tuggerah Lakes	South Lake Macquarie	Coastal Lagoons
Total Number	1	1	1	1
Excellent	67%	19%	100%	0%
Good	11%	56%	0%	25%
Fair	11%	25%	0%	25%
Poor	11%	0%	0%	25%
Very Poor	0%	0%	0%	25%

	Ocean Beaches	Ocean Baths	Estuarine Sites	Lake / Lagoon site
Total Number	1	1	1	1
Very Good	13%	0%	0%	0%
Good	80%	75%	0%	25%
Fair	0%	0%	0%	0%
Poor	7%	25%	100%	75%
Very Poor	0%	0%	0%	0%

Table 4 and 5: Summary of ecological health water quality grades 2017-18 and recreational water quality grades 2018-19

Recreational Water Quality

Recreational water quality on the Central Coast is routinely monitored through the Beachwatch program to assess how suitable a site is for swimming. Monitored locations include ocean beaches, ocean baths, estuarine areas in Brisbane Water, and designated swimming areas in other coastal lakes and lagoons.

This information provides a long term and accurate record of microbial contamination of the water, reported as annual Beach Suitability Grades, which enable individuals to make informed decisions about where and when to swim.

The 2018–19 Beachwatch Report Card for the Central Coast identified the following long-term water quality results with respect to swimming suitability:

- Of the 32 sites monitored (including 15 ocean beaches, 4 estuarine sites, 10 lake/lagoon sites, and 3 ocean baths), 50% swimming sites graded 'good' or 'very good'
- MacMasters Beach and Killcare Beach had 'excellent' water quality and were suitable for swimming almost all of the time.

Rainfall generates stormwater runoff and can sometimes trigger discharges from the wastewater systems where the system capacity is exceeded, which are major drivers of pollution to recreational waters. Estuarine and lake/lagoon swimming sites did not perform as well as ocean beaches. This result is consistent with other urban waterways with lower levels of flushing, which increase recovery times from stormwater / pollution events.

The State of the Beaches Report is published annually and is available on the NSW Government's website: https://www.environment.nsw.gov.au/research-and-publications/publications-search/state-of-the-beaches-2017-2018-central-coast-region

Location	Beach Suitability Grade (Very Good, Good, Fair, Poor, Very Poor)	Percentage of Dry Weather within Safe Swimming Limit
Gwandalan	Poor	76%
Summerland Point Baths	Poor	85%
Mannering Park Baths	Poor	55%
Chain Valley Bay	Poor	72%
Lake Munmorah Baths	Poor	80%
Lakes Beach	Good	95%
Canton Beach	Poor	63%
Cabbage Tree Bay Rockpool	Poor	87%
Soldiers Beach	Good	95%
North Entrance Beach	Good	96%
The Entrance Beach	Good	95%
The Entrance Ocean Baths	Good	93%
Toowoon Bay	Poor	80%
Shelly Beach	Good	92%
Wamberal Lagoon	Poor	74%
Yattalunga Baths	Poor	82%
Wamberal Beach	Good	93%
Terrigal Lagoon	Poor	68%
Terrigal Beach	Good	89%
Woy Woy Baths	Poor	55%
North Avoca Beach	Good	92%
Avoca Lagoon	Poor	67%
Avoca Beach	Good	91%
Davistown Baths	Poor	72%
Cockrone Lagoon	Poor	82%
Copacabana Beach	Good	92%
MacMasters Beach	Very Good	100%
Ocean Beach	Good	100%
Pretty Beach Baths	Poor	77%
Umina Beach	Good	97%
Killcare Beach	Very Good	96%
Pearl Beach Rockpool	Good	97%

Table 6: Central Coast recreational water quality health grades - Central Coast Beachwatch Report Card 2018–19

Natural Hazards

Natural waterway environments are subject to hazards such as catchment and storm surge flooding, tidal inundation, coastal erosion and shoreline recession. These hazards are a natural phenomenon and become a concern when they threaten community safety and wellbeing or adversely impact assets, such as infrastructure, essential services or residential land.

Catchment areas subject to flooding are characterised as 'flood prone land', which has been identified by a range of technical studies undertaken by Council. Land at risk from coastal hazards (e.g. beach erosion) has also been mapped through various technical studies over the years.

Several Central Coast beaches are particularly exposed to coastal erosion due a high concentration of development on dune systems near to the ocean. NSW beaches that are most at risk from coastal erosion are recognised by the NSW Government as Significant Open Coast Locations (SOCL). Four (4) of the 16 declared SOCL are located on the Central Coast.

A state-wide assessment by the NSW Government identified the Central Coast as having the highest exposure level to erosion relative to other NSW local government areas, based on modelled hazard lines.

Pressure

Natural Hazard Impacts

Like all of NSW coastal local government areas, the Central Coast is exposed to natural hazards that impact waterway areas from the catchment to the coast. Historically, severe weather events have caused significant impacts to the region – such as the Sygna 1974 coastal storm that resulted in widespread beach erosion and flooding.

Over the past 5 years, a number of floodplain and coastal hazards have impacted catchment and beach areas on the Central Coast. For example, a large east coast storm in June 2016 resulted in severe erosion of several beaches, including Wamberal. More recently, in February 2020 an intense and prolonged rainfall event resulted in flooding of low-lying residential areas around the margins of Tuggerah Lakes estuary and other catchment areas.

It is important to understand the potential threat of natural hazards, and then address identified risks to the community and environment in a considered and proactive manner.

Climate Change Impacts

Global warming is causing the climate to change on the Central Coast. The impacts of climate change on the natural waterway environment are being experienced now, and the severity of these impacts are expected to increase over time.

Climate change stressors such as sea level rise, increased temperatures and heavy rainfall events are expected to alter the physical processes that operate within our catchment to coast waterway areas. These will increase the occurrence and severity of natural hazards such as coastal flooding.

Ecological health and functioning will also be modified by climate change, for example, through wetland areas being squeezed or lost around estuary margins. Loss of wetland areas will have flow on effects for water quality in the downstream environments and broad impacts on the fish and birds that use these coastal habitats.

There is good opportunity to identify future climate risks to the natural waterway areas now and take action to avoid, mitigate or adapt to these risks through sound coastal management planning.

Legacy Development

Historic land use practices including land clearing, urban development, poor stormwater management and other legacy issues present an ongoing challenge for managing coastal waterways. Clearing and development of river valleys and floodplains results in loss of habitat connectivity, degradation of riparian systems, streambank erosion and increased pollutant loads.

Incremental changes to hydrology and water cycles affects ecological processes and the capacity of natural systems to provide ecosystem services and buffer residential areas from the impacts of coastal hazards.

Past draining and reclamation works has removed important wetland, saltmarsh and mangrove filters, while foreshore modification, jetty and wharf construction, and boat moorings have damaged sensitive seagrass communities.

Water Pollution

Developing catchment areas results in increased rates of water pollution in the form of nutrients, sediment, contaminants and marine debris (including micro plastics) entering into the waterway systems. These contaminants have a significant, long-term effect on the water quality and ecological health of the catchment and coastal waterway systems. This is particularly relevant in sensitive ecosystems with limited natural flushing. For example, the average residence time of water in Lake Munmorah is 520 days, compared to Brisbane Water with 21 days and Terrigal Haven with 2-8 hours. This highlights the sensitivity of some coastal systems to prolonged pollution loads.

Good stormwater management and water sensitive urban design are key to the long-term sustainability of natural waterways and coastal environments. Sound planning and strong investment in old and new areas is paramount to achieving water quality objectives.

Sewage effluent is another source of pollution, which can escape the sewerage system or overflow from on-site sewer management systems. Overflows during high rainfall conditions can cause substantial release of sewage, affecting water quality. The drivers of sewage pollution are diverse, but can include aging infrastructure, sewer chokes, poorly sealed manholes and system overloads. These are actively managed by Council.

Population Growth

The population of the Central Coast region continues to grow, with a projected population of 414,615 by 2036. Increased resident and visiting populations will result in land use intensification that exerts a variety of pressures on the natural waterway environments. For example, increased development of coastal catchments will result in greater stormwater pollution discharging into estuary and ocean beach environments, which degrades the ecological health of our waterways.

Population increase will also lead to progressively increased demand for community use of available assets over time. This may impact on people's engagement and relationship with the natural waterway and coastal zone environments.

Response

Council develops strategic plans for the floodplain, estuary, wetland and coastline areas to identify and manage natural hazards, prioritise management actions, guide the delivery of on ground works, monitor water quality and ecological health, educate and engage our community, and foster the economic wellbeing for the region.

Several key Council initiatives are progressing which will respond to pressures and guide the sustainable management of natural waterway areas, including:

- Development of Coastal Management Programs to guide the integrated management of all coastline and estuary areas
- Development of Floodplain Risk Management Studies and Plans to identify and address flooding risks associated with flood prone land
- Implementation of existing Management Plans
- Environmental monitoring programs which guide on-ground outcomes
- Investment in asset upgrades including an $11 million investment over the next 4 years in region-wide sewer network upgrades targeting gravity sewer infrastructure.

Coastal Management Programs

Collectively, Council's coastline, estuary, lagoon, lake and wetland areas are arguably the Central Coast's greatest natural asset as they provide important environmental, social and economic benefits that are highly valued by the community.

Over the past decade, the coastal waterways and environment has been managed through Estuary Management Plans and Coastal Zone Management Plans. Council is now updating these old plans, and filling in any gaps through the preparation of Coastal Management Programs (or CMPs) under a new coastal management framework. CMPs will set out the long-term strategy for managing the coastal zone in an ecologically sustainable way, for the social, cultural and economic well-being of the Central Coast community. CMPs are underway for Brisbane Water, Tuggerah Lakes estuary and the remaining coastline (beach and lagoon) areas.

Floodplain Risk Management

Flooding is a natural phenomenon that occurs when water flows across land that is usually dry. This can occur from prolonged rainfall events that impact catchment areas, intense storms that result in water flowing overland in urban and rural settings and/or coastal events such as storm surge flooding.

Different types of flooding can combine to form co-incident catchment and coastal inundation. Increased storm intensity and sea level rise will increase the frequency and intensity of flood prone land, especially around the coastal margins.

Council manages floodplain risks in line with the NSW Government Floodplain Risk Management Policy and Floodplain Development Manual, by preparing Flood Studies and Floodplain Risk Management Plans. This helps Council and the community to understand the nature and extent of flood hazard and develop strategies to reduce flood risks. Council has an ongoing process of preparing new studies and plans for areas not previously covered in this ongoing program, whilst also updating studies and plan as required.

Implementation of Management Plans

In parallel to the development of new CMPs, Council continues to deliver actions from existing Estuary and Coastal Zone Management Plans. With the support of external grant funding, these actions have included streambank rehabilitation, stormwater improvements, wetland, saltmarsh and foreshore remediation, recreational upgrades and routine maintenance activities.

On the open coast, Council is rolling out new beach accessways to provide safe and accessible beaches as well as ongoing beach maintenance and coastal lagoon management.

Council also implements management measures outlined in Floodplain Risk Management Plans, which include capital works such road and drainage upgrades, emergency management measures and community education.

Environmental Monitoring Programs

Council has a number of ongoing monitoring programs that are used to measure the condition of the natural waterway areas and inform management practices. These include:

- Environmental monitoring of ecological health and recreational amenity of coastal waterway and beach areas, which is delivered through the Central Coast Waterways Report Card and Beachwatch programs
- Water Quality Audit at Terrigal and Coastal Lagoons, which seeks to identify and remediate sources of water quality pollution
- Beach Health Aerial Survey Monitoring of Central Coast beaches, which surveys beach conditions and calculates volumes of sand that may buffer assets from coastal erosion impacts

Waterways Report Card

The Central Coast Waterways Report Card is an innovative, water quality monitoring program focused onecological health of estuaries on the Central Coast. The program builds on the NSW Estuary Ecosystem Health Protocols (DPIE, 2016) and is delivered in partnership with scientists from the NSW Government.

The Waterways Report Card is developed and published annually by Council, with the first report for the LGA delivered in 2019. The report takes complex water quality and biological information and presents it to our community in a simple and easy to understand format.

The program spans all eight estuaries on the Central Coast, including 36 sites which are each given a water quality grade ranging from A (excellent) to F (very poor). The program integrates with existing waterway management programs and will be an integral reporting mechanism for future CMPs.

Terrigal and Coastal Lagoons Audit

The Terrigal and Coastal Lagoons Audit is a comprehensive water quality monitoring project investigating water quality at Terrigal Beach, Terrigal Haven, Terrigal Lagoon, Wamberal Lagoon, Avoca Lagoon and Cockrone Lagoon.

Council and the NSW Government are working in partnership to develop this innovative pilot program which investigates possible sources of pollution in each catchment, determines the impact on long-term water quality, and prioritises targeted remediation works.

The program commenced with a focus on Terrigal Beach and Terrigal Haven in 2019 and has since moved into preliminary monitoring and source tracking in the coastal lagoons. Pending the success of the water quality audit, this program may be rolled out across other natural waterway areas on the Central Coast.

Glossary

(CO)	Carbon
(NO2)	Nitrogen Dioxide
(SO2)	Sulphur Dioxide
CBD	Central business District
CDS	Container Deposit Scheme
CMP	Coastal Management Program
CSP	Community Strategic Plan
EV	Electric Vehicle
GHG	Greenhouse Gas
GSMR	Greater Sydney Metropolitan Region
ha	Hectare
Kt	Kilotonne
KW	Kilowatt
LED	Light-Emitting Diode
LGA	Local Government Area
LHR	Lower Hunter Region
MUD	Multi-Unit Dwelling
MW	Megawatt
NOx	Nitrogen
NSW EPA	NSW Environment Protection Authority
NSW OEH	NSW O ice Environment and Heritage
PM10 and 2.5	Fine Particulate Matter
POEO	Protection of the Environment Operations Act
PPM	Parts Per Million
ROCs	Regional Organisation of Councils
SSROC	Southern Sydney Regional Organisation of Councils
VOCs	Volatile Organic Compounds Voluntary
VWMG	Waste Management Group Waste
WARR	Avoidance and Resource Recovery

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Central Coast Council

State of the Environment Report

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